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EDITED BY

C. W. VALENTINE

(*Professor of Education in the University of Birmingham*)

WITH THE ASSISTANCE OF

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E. L. THORNDIKE

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VOLUME IV. FEBRUARY, 1934 PART I.

THE INFLUENCE OF PREVIOUS TEACHING EXPERIENCE ON RESULTS OBTAINED BY STUDENTS IN A UNIVERSITY DEPARTMENT OF EDUCATION.

BY G. H. TURNBULL.

PART I.

I.—*The enquiry and its purposes.*
II.—*The evidence available and the use made of it.*
III.—*The results of the enquiry.*

PART II.

*The bearing of this enquiry on the Aberystwyth enquiry.**

PART I.

I.—THE ENQUIRY AND ITS PURPOSES.

I HAVE for a long time been interested, for various reasons which I need not set out here, in the question of the value of previous teaching experience to students who are preparing in the University Training Departments for the work of teaching. From a consideration of the evidence which has been accumulating in regard to students of this department during a period of ten years, from the session 1922-23 to the session 1931-32 inclusive, my colleague, Mr. E. J. G. Bradford, and I have lately been attempting to find an answer to that question.

There were three main purposes in our enquiry:

(1) To show whether students with previous teaching experience did or did not do better in practical teaching than those who had had no such experience;

(2) To show whether students with previous teaching experience did or did not do better in their academic work for a degree than those who had had no such experience;

(3) To show whether students with previous teaching experience did or did not do better in educational theory than those who had had no such experience.

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* See articles by A. Pinsent in this *Journal*, Vol. III, Part II, pp.109-126, and Part III, pp. 201-221.

II.—THE EVIDENCE AVAILABLE AND THE USE MADE OF IT.

We did not discriminate between men and women students. We compared with the students who had never taught before *all* those who had had some previous teaching experience, no matter how long or how short (provided it had lasted for at least one month, although as a matter of fact no one had done less than three months), and no matter in what capacity they had taught, whether as uncertificated assistants, as pupil teachers or student teachers, or as supply teachers. The students were nearly all four-year students, but some were graduates admitted to the Diploma course either as fourth year students or as fee-paying students. There were also in the first four years a (decreasing) number of three-year students, combining academic work for a degree with professional training for recognition by the Board of Education as trained certificated teachers, but not working for the University Diploma in Education; and every year there were a few "reduced" students taking the second year of a two-year course for recognition by the Board of Education as trained certificated teachers.

For purposes of convenience in the first summary of the results we put students who obtained a "good" degree, i.e., first class or second class (first division) honours, into one group, those who obtained a degree, i.e., second class (second division) or third class honours or a pass degree, into another, and those who failed in the Final examination or in the Intermediate examination into a third group. During the years prior to the session 1928-29 we had used only clear categories, without plus or minus signs, for teaching marks; we therefore grouped the students under this heading into the five classes, A, B, C, D, and E. For educational theory we made the following four classes: those who had passed the Diploma examination with more than 50 per cent of the total marks; those who had passed the Diploma examination with 50 per cent or less of the total marks; those not in the first or second class who had been recommended for recognition by the Board of Education as trained certificated teachers; and those who had not even been recommended for recognition by the Board of Education as trained certificated teachers.

Later, in an attempt to show the evidence in a conveniently simple final form, we modified the classification by:

(1) Making three classes for practical work: (*a*) the A's and B's; (*b*) the C's; (*c*) the D's and E's;

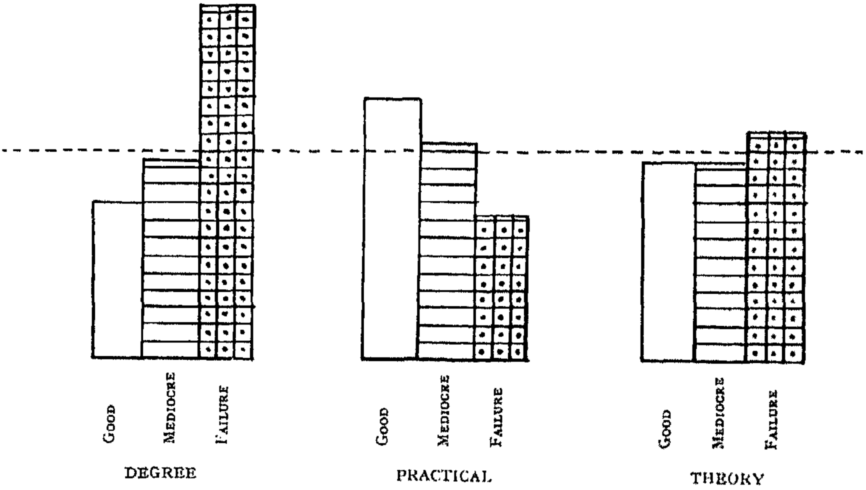
(2) Making three classes for theoretical work: (*a*) good, i.e., over 50 per cent; (*b*) mediocre, i.e., those who obtained the Diploma but did not get more than 50 per cent; (*c*) those who fell below the Diploma standard.

There were in all 750 students, of whom 181 had had some previous teaching experience, a reasonably large number as in Mr. Pinsent's investigation.* Our students, like his, were drawn from a wide area and from all sorts of schools, including large urban and small rural types. Of the six persons who formed the staff of the department in 1922, four remained in 1932, and after the first year, the session 1922-23, the students admitted to the department were all selected by the same person, myself.

III.—THE RESULTS OF THE ENQUIRY.

GRAPH I.

COMPARING THE ACHIEVEMENTS OF STUDENTS WITH AND WITHOUT PREVIOUS TEACHING EXPERIENCE DURING THE YEARS 1922-23 TO 1931-32.



The dotted line indicates the percentage of the total group formed by the students with previous teaching experience. The columns represent the percentage of each grade formed by the students with previous teaching experience.

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* *British Journal of Educational Psychology*, Vol. III, Part II, pp. 111 and 116.

Graph I shows the results of the enquiry. They may be summarized briefly as follows:

(1) On the whole, students with previous teaching experience did a little better in practical teaching than those who had had no such experience;

(2) On the whole, students with previous teaching experience did definitely worse in degree work than those who had had no such experience;

(3) On the whole, students with previous teaching experience did no better and no worse in educational theory than those who had had no such experience.

In regard to the first result, my own impression, and that of some at least of the members of my staff, had been that students with previous teaching experience did worse; so much for impressions as compared with statistics! I suppose we had in mind some very bad cases of poor teaching by such students; we had probably found student teachers possessed of a certain technique in teaching, had expected them to make progress during the course, and had been disappointed. The explanation is, no doubt, quite simple; having already made some progress towards their maximal teaching efficiency before entering the department, they could not improve so much on their first efforts under departmental supervision.

The second result had long been suspected, and it is mentioned in the Report of the Departmental Committee on the Training of Teachers (p. 73) that "the growth of mind and character to be expected in the period of school life after the First Examination is so valuable that some very clear advantage ought to be shown to justify any system which breaks off the full school course at this point." I had myself been alarmed at the number and extent of the failures in degree work among those who had been student teachers before entering the University; e.g., in 1924-25, of four students who failed in the Final examination three had previously been teachers, and of twelve who failed in the Intermediate examination ten had been teachers.

PART II.

THE BEARING OF THIS ENQUIRY ON THE ABERYSTWYTH ENQUIRY.

Our enquiry, as described in Part I, is not in all respects strictly comparable with that of Mr. Pinsent. We have not, for example, as he has, collected the evidence about the ages of our students; nor have we information which we can use about the intelligence scores of our students, because our scheme for intelligence testing was not put into operation until the session 1925-26, and even then the tests were in that session and in subsequent years given to candidates for admission, mostly to the four-year course, and not, as at Aberystwyth, to students at the beginning of the professional year.

One interesting consideration that arises from the two enquiries, however, is as to how far our findings agree with Mr. Pinsent's conclusions concerning students with previous teaching experience and students without previous teaching experience on the following points: their achievements in practical teaching, in academic work for a degree, and in educational theory during their professional year.

Unfortunately, here again, in working out a table for the comparative success of Sheffield students with and without previous teaching experience, we have data which are not quite comparable with those used by Mr. Pinsent. We had only two women students during the session 1922-23 who had served as uncertificated assistants before entering the University, and only one woman among seven other uncertificated assistants who entered the department in the remaining nine sessions. Obviously, therefore, we have no evidence on which to base any reliable conclusions concerning the comparative performances of men and women students with previous experience as uncertificated assistants, and it has been necessary for us to combine the men and women students in Table I.

Moreover, it has been thought advisable to treat the session 1922-23 separately (Table Ia), because during it, out of a total of eighty students, we had sixteen with previous teaching experience as uncertificated assistants, whereas in the whole remaining period of nine years we had only seven students who had been uncertificated assistants. One wonders whether, in the case of the Aberystwyth students, the uncertificated assistants were similarly "bunched" in the earlier years; Mr. Pinsent has not given any information on this point.

Finally, some other considerations are suggested by the evidence from Aberystwyth. If the uncertificated assistants were mostly the product of pre-war school conditions, whereas the student teachers and others were predominantly the product of war and early post-war school conditions, this difference may have produced results that vitiate the conclusions drawn from the collected data. Further, if it be admitted that girls' schools were less affected by war conditions than boys' schools, "the conspicuous differences" and the absence of "compensating advantages" among women students noted by Mr. Pinsent (p. 204) may also be due to the school conditions prevailing at the time. It is possible, moreover, that the whole of Mr. Pinsent's tentative conclusions are vitiated by the fact that he compares two groups (experienced and inexperienced) which have very different average intelligence quotients (Table V, p. 207); the legitimacy of this procedure is at least suspect.

TABLE I.

COMPARING THE ACHIEVEMENTS IN DEGREE WORK, PRACTICAL TEACHING AND EDUCATIONAL THEORY OF STUDENTS WITH PREVIOUS TEACHING EXPERIENCE AND STUDENTS WITHOUT PREVIOUS TEACHING EXPERIENCE DURING THE SESSIONS 1923-24 TO 1931-32.

		Degree Work.			*Practical Teaching.*			*Educational Theory.*		
		Honours Classes I and IIa.	*Honours Classes IIb and III, and Pass.*	*Fail.*	*A. and B.*	*C.*	*D.*	*Over 50%*	*Pass up to and including 50%*	*Below Diploma standard.*
Students with previous teaching experience	No.	30	74	40	54	77	13	50	38	56
	%	21	51½	27½	37½	53½	9	34½	26½	39
Other Students	No.	162	309	55	147	301	78	189	160	177
	%	31	59	10	28	57	15	36	30½	33½
Total	No.	192	383	95	201	378	91	239	198	233
	%	28½	57½	14	30	56½	13½	35½	29½	35

TABLE IA.

SHOWING THE ACHIEVEMENTS DURING THE SESSION 1922-23 IN DEGREE WORK, PRACTICAL TEACHING AND EDUCATIONAL THEORY OF A GROUP OF SIXTEEN STUDENTS WHO HAD BEEN UNCERTIFICATED ASSISTANTS.

		Degree Work.			*Practical Teaching.*			*Educational Theory.*		
	No.	*Honours Classes I and IIa.*	*Honours Classes IIb and III, and Pass.*	*Fail.*	*A. and B.*	*C.*	*D.*	*Over 50%*	*Pass up to and including 50%*	*Below Diploma standard.*
Uncertificated Assistants ..	16	3	10	3	8	6	2	3	7	5
TOTAL	80	14	52	14	23	42	15	18	20	42

The conclusions to be drawn from this evidence are those already set out in Part I. They are interesting as showing, at any rate for men and women students combined, no such marked connection between pre-college teaching experience and teaching grade in the professional year as was found by Mr. Pinsent for the men students at Aberystwyth.* On the other hand, they confirm two of his other conclusions by indicating the comparative weakness in academic work of students with previous teaching experience and their failure to do better work in educational theory than students with no such previous experience. This last finding seems to suggest that the students with no previous teaching experience got as much out of the theoretical part of the course as the others, a consideration which is worth comparing with the answers given by students to the questionnaire sent out by Miss M. Phillips.† But this subject is bound up with the question of the way in which the professional year is planned, and especially with the question of whether or not a start is made during that year with practical work in schools; and these questions need not be considered here.

Mr. Pinsent calls attention (Table VIII, p. 215) to sex differences between men and women students, which are most pronounced in the connection between academic record and teaching grade. This particular difference between men and women students, however, may very well be due to the inclusion of older men whose teaching experience as uncertificated assistants resulted in their obtaining higher teaching marks but having poorer academic records. This suggested explanation seems to be confirmed by our own correlations between teaching grade, academic record and educational theory (Table II),‡ which show no significant sex difference at all. In calculating the contingency coefficients only the records for the seven sessions from 1925-6 to 1931-2 have been included, those for the three preceding sessions from 1922-3 to 1924-5 having been excluded in order to ensure the elimination of the uncertificated assistants and to prevent the changes in the theoretical courses which were made in the earlier years from affecting the result.

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* I should like to point out, moreover, that it is manifestly unfair to compare in teaching ability students who have had a year's experience and then a year's course of professional training with those who have had only the course of professional training. A much fairer and more valuable comparison would be between the former and students who have had a year's experience of teaching after a year's course of professional training; if it cannot be shown that the former are better teachers than the latter, then the system which causes a break in the intending-teacher's academic studies is robbed of its main supporting argument and has nothing to recommend it.

† *British Journal of Educational Psychology,* Vol. I, Part III, pp. 231 and 236.

‡ The detailed tables of which this is a summary are to be found in the Appendix.

TABLE II.

SHOWING CORRELATIONS BETWEEN PAIRS OF FACTORS CALCULATED FOR MEN AND WOMEN STUDENTS SEPARATELY.

		Educational Theory.	*Teaching Grade.*
Academic Record	Men.	·55	·35
	Women.	·53	·27
Educational Theory	Men.	—	·42
	Women.	—	·36

APPENDIX.

DETAILED TABLES SHOWING THE CORRELATIONS BETWEEN EACH PAIR OF THE THREE FACTORS—TEACHING GRADE, ACADEMIC RECORD, AND EDUCATIONAL THEORY—CALCULATED FOR MEN AND WOMEN STUDENTS SEPARATELY.

MEN.

		Educational Theory.		
		Over 50%	*Pass up to and including* 50%	*Below Diploma Standard.*
ACADEMIC RECORD.	Honours, Classes I and IIa	44	15	4
	Honours, Classes IIb and III, and Pass	32	49	30
	Fail	0	3	32

C= ·55.

		Teaching Grade.			
		A.	*B.*	*C.*	*D.*
ACADEMIC RECORD.	Honours, Classes I and IIa......	9	22	30	2
	Honours, Classes IIb and III, and Pass	1	32	60	18
	Fail	0	7	19	9

C= ·35.

EDUCATIONAL THEORY.

	Teaching Grade.			
	A.	*B.*	*C.*	*D.*
Over 50%	10	28	35	3
Pass up to and including 50% ..	0	20	41	6
Below Diploma Standard	0	13	33	20

C= ·42.

WOMEN.

ACADEMIC RECORD.

	Educational Theory.		
	Over 50%	*Pass up to and including 50%*	*Below Diploma Standard.*
Honours, Classes I and IIa	63	19	2
Honours, Classes IIb and III, and Pass	61	95	43
Fail	0	5	25

C= ·53.

ACADEMIC RECORD.

	Teaching Grade.			
	A.	*B.*	*C.*	*D.*
Honours, Classes I and IIa	5	28	49	2
Honours, Classes IIb and III, and Pass	3	48	129	19
Fail	0	5	16	9

C= ·27.

EDUCATIONAL THEORY.

	Teaching Grade.			
	A.	*B.*	*C.*	*D.*
Over 50%	5	44	72	3
Pass up to and including 50% ..	3	33	76	7
Below Diploma Standard	0	4	46	20

C= ·36.

RÉSUMÉ.

DE L'INFLUENCE DE L'EXPÉRIENCE ANTÉRIEURE DANS L'ENSEIGNEMENT SUR LES RÉSULTATS OBTENUS PAR LES ÉTUDIANTS DE LA SECTION PÉDAGOGIQUE D'UNE UNIVERSITÉ.

La question de la valeur de l'expérience antérieure pour les étudiants que les universités préparent à entrer dans l'enseignement a été très discutée, et elle est fort importante. Cette enquête, faite à l'Université de Sheffield, est une tentative de trouver une réponse à cette question par l'analyse des notes obtenues dans les études universitaires conduisant à un diplôme, dans l'enseignement pratique et dans la théorie pédagogique pendant la préparation professionnelle de 181 étudiants, ayant déjà eu quelque expérience pratique, comparées avec celles de 569 étudiants dépourvus d'une telle expérience.

Il en ressortit que les étudiants munis d'expérience pratique obtinrent des notes légèrement supérieures pour l'enseignement pratique, des notes nullement supérieures pour la theorie pédagogique, et des notes définitivement inférieures pour les études du diplôme.

Il vaut la peine de comparer ces conclusions avec celles rapportées par Aberystwyth University College dans ce Journal Tôme III, 2e Partie, pp. 109-126 et 3e Partie, pp. 201-221.

ZUSAMMENFASSUNG.

DER EINFLUSS VORHERGEHENDER LEHRERFAHRUNG AUF DIE VON STUDENTEN AN EINER AKADEMISCHEN ABTEILUNG FÜR PÄDAGOGIK ERZIELTEN RESULTATE.

Das Problem vom Werte vorhergehender Lehrerfahrung für Studenten, die an den Universitäten für den Lehrberuf vorbereitet werden, ist viel umstritten worden und ist sehr wichtig. Diese auf der Universität Sheffield gemachte Untersuchung versucht eine Lösung jenes Problems durch Analyse von Ergebnissen der Ausbildung, die zu einem akademischen Grade führt. Die Ausbildung bezieht sich auf Lehrpraxis und pädagogische Theorie in dem pädagogischen Studium von 181 Studenten mit vorhergehender Lehrerfahrung im Vergleich mit 569 ohne derartige Erfahrung.

Man fand, dass die Studenten mit vorhergehender Lehrerfahrung ein wenig besser beim praktischen Unterricht abschnitten als die anderen, dass sie aber nicht mehr in der pädagogischen Theorie und entschieden Schlechteres in den rein akademischen Prüfungen leisteten. Es lohnt sich, diese Ergebnisse mit denen zu vergleichen, die für Aberystwyth University College in dieser Zeitschrift, Band III, Teil II, S.109-S.126 und Teil III, S-201-S.221 beschrieben sind.

TEACHERS' REACTIONS TO MALADJUSTMENTS OF SCHOOL CHILDREN.

S. R. LAYCOCK.

(*From the College of Education, University of Saskatchewan.*)

I.—*Object of the investigation.*
II.—*Method of enquiry. First questionnaire.*
III.—*Results of first questionnaire.*
IV.—*Method of enquiry. Second questionnaire.*
V.—*Results of second questionnaire.*
VI.—*Summary and conclusions.*

I.—OBJECT OF THE INVESTIGATION.

IN 1929 the writer received a grant from the Canadian National Committee for Mental Hygiene for the purpose of studying the personality and behaviour maladjustments of school children. In inaugurating such a programme of research the question was necessarily raised as to just what makes a child a problem child. Which form of maladjustment is most common ? Among those that do occur which are the most serious from the teacher's point of view ? Do mental hygienists agree with teachers on this point ? Do teachers of different school systems and of different nations agree in outlook, or do differences in training and in cultural and national background give rise to important differences in point of view ?

An investigation into teachers' attitudes towards children's behaviour has been carried out in two representative American cities by Dr. E. K. Wickman* of the Commonwealth fund staff. The present investigation is an attempt to discover the reactions of the teachers of a Western Canadian city and to compare these with Wickman's findings.

The teachers whose reactions are the object of the present study represent a British country. Their background of teacher training is different. While greatly affected by currents of thought from the United States, they are also greatly influenced by currents of thought from the other nations of the British Commonwealth, especially from Great Britain. It was felt, therefore, that it was unsafe to assume that they would identify the problem child in the same way; that they would necessarily encounter the same maladjustments with the same degree of frequency; or that they would regard those occurring as serious to the same degree as was found to be the case by Dr. Wickman in the cities of Minneapolis and Cleveland.

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* *Children's Behaviour and Teachers' Attitudes*, Commonwealth Fund, New York.

The more fundamental reason for carrying out this investigation lies in the fact that, in studying the personality and behaviour maladjustments of school children the teachers' reactions to these adjustments are essentially a part of the situation. Wickman points out that Webster's definition of behaviour has a social implication. The definition is: "behaviour applies to our mode of behaving in the presence of others or towards them." If this be true, any attempt to study the adjustments of school children without a study of the reactions of those to whom they adjust is foredoomed to failure. The teacher's reaction to a child's behaviour cannot be separated from that behaviour. It is an integral part of it. It is a well-known fact that children often behave quite differently with different teachers. As Wickman says, "There can be no problems of behaviour in the active social sense unless somebody reacts to them as such." As a basis for more extensive investigations it was therefore the aim of this study to discover how the teachers of a Canadian city react to the personality and behaviour adjustments of the children under their care.

II.—METHOD OF ENQUIRY. FIRST QUESTIONNAIRE.

The present study was carried out in Saskatoon, a city of 45,000 population, situated in the wheat-growing province of Saskatchewan. The population of the province is predominately rural, only one other city being as large as Saskatoon in Canada's third largest province. The public elementary school population of the city is roughly 7,000. This includes practically all the children of elementary school age since there are no private schools for these children. The city is of very recent growth and the teachers have had their teacher training in normal schools and training colleges representative of every Canadian province and of the British Isles. The teachers, therefore, may be thought of as representative Western Canadian teachers.

One hundred and sixty-seven teachers of the public (elementary) school staff co-operated in this investigation. Every possible courtesy and facility was extended by the School Board and Superintendent of Schools in making this investigation possible. The first step in the study was to send out to all the teachers the following questionnaire, adapted from Wickman's.

Questionnaire I.—Suggestions to Teachers.

"This questionnaire is the first step in a study of the behaviour maladjustments of school children in the Saskatoon schools. The ultimate purpose is an attempt to ascertain the various conditioning factors (physical, mental, social) that operate in the production of behaviour problems in school children and to work out methods for the correction and treatment of these problems.

"It is essential to secure a reliable method for the selection of behaviour problem cases. Teachers' judgments will be of great value in making this selection. To this end it is necessary, first of all, to secure information on the question, "*What kind of behaviour in school children is undesirable*?"

"Will you, therefore, be good enough to co-operate in this investigation by listing *on the accompanying sheet* the specific forms of behaviour that you regard as undesirable or objectionable? List all kinds of behaviour maladjustments that have come under your observation in your entire experience as a teacher. Do not give the causes of "bad" behaviour, but merely state the exact behaviour that is undesirable. Record your answers briefly, using a single word, or at most a phrase. Please make your list as complete as possible. It is not serious if there is overlapping in the answers. It is scarcely necessary to point out that the entire school situation should be kept in mind—outside the classroom as well as within it.

"As an independent judgment is greatly desired, *please do not discuss this questionnaire with any of your colleagues* before you have turned in your paper."

An appropriate answer sheet was provided with the above directions.

III.—RESULTS OF FIRST QUESTIONNAIRE.

In order that a comparison might be made with Wickman's investigation his classification of undesirable personality and behaviour adjustments was followed. The results are given in Table I, the numbers given in each case being the total number of times the form of maladjustment was found in the return sheet of 167 teachers.

TABLE I.

RESULTS OF QUESTIONNAIRE ON UNDESIRABLE BEHAVIOUR SUBMITTED TO 167 SASKATOON TEACHERS.

GROUP (1)	*Violations of General Standards of Morality and Integrity.*—Items under this heading, 499. These include stealing and dishonesties (354 items), immorality (50 items), profanity (50 items).
GROUP (2)	*Transgressions against Authority.*—Total items on teachers' return sheets, 171. These include disobediences, defiance, impertinence, insubordination, sauciness, etc.
GROUP (3)	*Violations of General Regulations.*—Total items listed, 125. These include such items as truancy, tardiness, chewing gum, etc.
GROUP (4)	*Violation of Classroom Rules.*—Total items listed under this heading, 151. These included disorderliness, restlessness, whispering, writing notes, noisiness, throwing paper, etc.
GROUP (5)	*Violations of School Work Requirements.*—Total items listed, 439. These included inattention, lack of concentration, lack of interest, laziness, idleness, etc.
GROUP (6)	*Difficulties with Other Children.*—Total items listed, 249. These included tattling, teasing, spitefulness, meanness, bullying, fighting, jealousy, etc.
GROUP (7)	*Undesirable Personality Traits.*—Total items listed under this heading, 672. These included negativisms such as obstinacy and stubbornness; unacceptable social manners; self-indulgences such as greediness and selfishness; aggressive personality traits, such as domineering, desire to show off, and boastfulness; recessive personality traits such as shyness, oversensitiveness, and feelings of inferiority; evasions such as failure to confess a fault; interferences such as meddlesomeness; lack of emotional control, such as temper outbursts and impulsiveness; undesirable mental states such as grouchiness, and unhappiness; and a considerable miscellaneous group.

The 167 Canadian teachers listed a total of 2,306 items of undesirable behaviour and personality items, averaging approximately 14 per teacher. Wickman's group averaged 15·85 per teacher.

Of the total number of undesirable traits listed, the percentage of items found under each of the groups according to the classification of Table I is found in Table II.

TABLE II.

PERCENTAGE OF ITEMS OF UNDESIRABLE BEHAVIOUR AS LISTED ON TEACHERS' RETURN SHEETS, CLASSIFIED BY GROUPS.

Group.	*Canadian Study. Per cent.*	*American Study. Per cent.*
(1) Violations of General Standards of Morality, etc.	21·64	18·1
(2) Transgressions against Authority	7·41	6·4
(3) Violations of General School Regulations	5·42	7·1
(4) Violations of Classroom Rules	6·55	16·7
(5) Violations of School Work Requirements	18·6	9·8
(6) Difficulties with Other Children	10·8	9·1
(7) Undesirable Personality Traits	29·1	32·5

The above percentages are in striking agreement, except in groups four and five. Here the difference, upon careful study, seems to be partly one of nomenclature and classification. Since the forms of undesirable behaviour listed on both Groups 4 and 5 are the outgrowth of the attempt to fit the child to the traditional curriculum and the traditional classroom organization, the writer believes that the above difference is not significant.

IV.—METHOD OF ENQUIRY. SECOND QUESTIONNAIRE.

From the list of undesirable personality and behaviour traits submitted by the teachers in the Canadian group the writer compiled a list of 109 traits on which the teachers were asked to pass judgment (1) as to the frequency with which these traits occurred in children, and (2) the seriousness of those traits. The form submitted is given in Questionnaire II. While this form was adapted from Wickman's, it deviates therefrom in the traits listed, having 109 items instead of 50. In securing the teachers' returns there was also this difference, that while Wickman's form was given to a group of teachers at one time with a set time limit, in the present study these forms were sent out to each teacher with instruction not to consult anybody but for each to exercise his or her independent judgment. While teachers were urged to do the whole rating at a sitting they were given over a week in which to complete the questionnaire.

Questionnaire II.

"This is the second questionnaire in the behaviour study of school children. The list of undesirable behaviour traits secured from the first questionnaire is presented herewith. The present purpose is to evaluate these traits by ascertaining their seriousness. This will be obtained by securing information on (1) the frequency of the occurrence of these traits in the children, and (2) the extent to which the possession of these traits makes a child maladjusted, disturbing, or a 'problem child.'"

"The list of undesirable traits has been tabulated down the middle of three sheets of paper. Space is provided on both sides of these items for you to rate each trait according to two measurements. ***On the lines at the left*** you are to indicate your judgment as to the ***frequency of the occurrence*** of these behaviour traits in school children. ***On the lines to the right*** you are to indicate your opinion as to the seriousness of these traits, i.e., how greatly does the possession of the trait affect the welfare of the child in making him maladjusted, disturbing, or a 'problem child.'

"You are to indicate your judgment by placing a check mark like this (/) on each line according to the caption at the top. You may place your check mark (/) at ***any*** point on the line. You need not make it directly on any of the divisional points. If you think your rating falls somewhere between two divisional points, you may make your check (/) at the approximate point just where you think it ought to go. This will permit you to make finer ratings. Make your markings with a pencil. This will permit you to make changes if necessary. Read the whole list through before beginning to rate. If possible do the whole rating at one sitting. ***Please do not consult anyone*** about this questionnaire. Below is a sample section of the scale showing the manner in which it is to be marked."

FREQUENCY SCALE. IN HOW MANY CHILDREN DOES THIS OCCUR?

SERIOUSNESS SCALE. HOW SERIOUS IS THIS IN A CHILD?

None.	*Very small number.*	*In about one half.*	*In almost all*	Forms of Behaviour	*Of no consequence.*	*Of only slight consequence.*	*Makes for considerable difficulty.*	*An extremely grave problem.*
	/			Stealing			/	
	/			Tattling		/		
	/			Shyness	/			

To these directions was attached the return form consisting of the 109 items to be rated as indicated.

Wickman's method of using a graphic rating scale was adopted, the lines in the sample being drawn in such a way that each trait could be marked on a scale of 20 units, each unit being one eighth of an inch in length. Thus on the Frequency Scale " none " is scored zero, "A very small number " is scored 4, " in about one half " is scored 12, and " in almost all " is scored 20. On the Seriousness Scale " of no consequence " is scored zero, " of only slight consequence " is scored 4, " makes for considerable difficulty " is scored 12, and " an extremely grave problem " is scored 20. By use of a ruler intermediate ratings between the guiding lines are scored.

V.—RESULTS OF QUESTIONNAIRE II.

The return sheets of the 167 teachers were scored and the mean rating for each trait determined. The results of the teachers' ratings on the frequency scale are given in order of mean rating in Table III below.

TABLE III.

TABLE SHOWING RELATIVE FREQUENCY OF 109 PERSONALITY AND BEHAVIOUR TRAITS AS RATED BY 167 TEACHERS ON A SCALE OF 20 UNITS.

No.	*Trait.*	*Mean Rating for Frequency.*	*Reliably more frequent than*
1	Whispering	11·82	4 and all below
2	Careless posture	10·62	5 ,, ,,
3	Carelessness	9·78	7 ,, ,,
4	Forgetting	9·73	7 ,, ,,
5	Inquisitiveness	8·75	10, 12 ,, ,,
6	Restlessness	8·64	10 ,, ,,
7	Thoughtlessness	8·19	15 ,, ,,
8	Inattention	8·10	16 ,, ,,
9	Lack of concentration	8·06	14 ,, ,,
10	Untidiness in work	7·37	18 ,, ,,
11	Teasing	7·31	18 ,, ,,
12	Noisiness in line and halls	7·24	21 ,, ,,
13	Chewing gum	7·11	23 ,, ,,
14	Impulsiveness	6·92	23 ,, ,,
15	Loquaciousness	6·85	24, 25, 26, 28 30 ,, ,,
16	Tattling	6·63	26, 28, 30, 33 ,, ,,
17	Excitable	6·60	26, 28, 30, 33 ,, ,,
18	Lack of effort	6·40	28, 33 ,, ,,
19	Too dependent	6·32	35, 38 ,, ,,
20	Boisterousness	6·26	38, 39, 41, 43 ,, ,,
21	Lying	6·01	41, 43 ,, ,,

TABLE III—*continued.*

No.	*Trait.*	*Mean Rating for Frequency.*	*Reliably more frequent than*
22	Desire to show off	5·90	52 and all below
23	Idleness and dawdling	5·80	47, 49 ,, ,,
24	Cheating	5·72	51 ,, ,,
25	Silliness and giggling	5·64	53, 55 ,, ,,
26	Lack of ambition	5·60	52 ,, ,,
27	Overcritical of others' faults	5·57	58 ,, ,,
28	Laziness	5·56	53 ,, ,,
29	Evades punishment	5·56	58 ,, ,,
30	Day dreaming	5·53	53, 55 ,, ,,
31	Erratic	5·51	55, 58 ,, ,,
32	Disobedience	5·50	58, 60 ,, ,,
33	Interrupting	5·49	58 ,, ,,
34	Lack of confidence, own ability	5·47	56, 58 ,, ,,
35	Untidiness (person)	5·39	55, 56, 58 ,, ,,
36	Failure to confess fault	5·34	58 ,, ,,
37	Meddlesomeness	5·33	58 ,, ,,
38	Indifference	5·19	59, 62 ,, ,,
39	Disregard rights of others	5·18	64, 66 ,, ,,
40	Persistency	5·11	72, 73, 74, 75, 77 ,, ,,
41	Nervousness	5·11	63 ,, ,,
42	Craving for sympathy	5·08	72, 73, 74, 75, 77 ,, ,,
43	Shyness	5·07	59, 64, 66 ,, ,,
44	Disorderliness	5·07	64, 67 to 75, 77 ,, ,,
45	Unsportsmanship	5·04	64, 67 to 75, 77 ,, ,,
46	Profanity	5·03	64, 67 to 75, 77 ,, ,,
47	Lack of group spirit	4·91	72, 73, 74, 75, 77 ,, ,,
48	Overimaginative	4·87	73, 75, 77 ,, ,,
49	Overconfident	4·86	72 to 75, 77 ,, ,,
50	Boastful	4·83	73, 75, 77 ,, ,,
51	Gossiping	4·77	73, 75, 77 ,, ,,
52	Self-conscious	4·76	72, 73, 75, 77 ,, ,,
53	Destroying materials and property	4·75	72 to 75, 77 ,, ,,
54	Roughness	4·74	72 to 75, 77 ,, ,,
55	Tardiness	4·69	72 to 75, 77 ,, ,,
56	Lack of interest in school work	4·62	73, 75, 77 ,, ,,
57	Officiousness	4·61	73, 77 ,, ,,
58	Rudeness	4·45	78, 81 ,, ,,
59	Quarrelsomeness	4·39	81, 83 ,, ,,
60	Deceitfulness	4·35	83, 84, 85, 87 ,, ,,
61	Jealousy	4·35	85, 87 ,, ,,
62	Fighting	4.28	87 ,, ,,
63	Impoliteness	4·28	87 ,, ,,
64	Untrustworthy	4·20	87 ,, ,,
65	Speaking aloud in school work	4·20	93 ,, ,,
66	Conceit	4·18	90 ,, ,,
67	Timidity	4·18	87 ,, ,,
68	Lack of emotional control	4·16	88, 90 ,, ,,

TABLE III—*continued.*

No.	*Trait.*	*Mean Rating for Frequency.*	*Reliably more frequent than*
69	Oversensitiveness	4·15	87 and all below
70	Lack of humour	4·15	91 ,, ,,
71	Failure to join group	3·97	98 ,, ,,
72	Domineering	3·95	95, 97 ,, ,,
73	Meanness	3·90	95, 97 ,, ,,
74	Too suggestible	3·88	98 ,, ,,
75	Cowardly	3·83	98 ,, ,,
76	Stealing	3·79	102 ,, ,,
77	Impertinence	3·75	98 ,, ,,
78	Sulkiness	3·74	98 ,, ,,
79	Resentful	3·74	99 ,, ,,
80	Self-pity	3·65	100 ,, ,,
81	Obstinacy	3·62	99 ,, ,,
82	Feeling of superiority	3·60	100 ,, ,,
83	Peevishness	3·57	99 ,, ,,
84	Bullying	3·57	99 ,, ,,
85	Marking lavatories and walls	3·51	100 ,, ,,
86	Sauciness	3·49	102 ,, ,,
87	Stubbornness	3·44	99 ,, ,,
88	Overconscientiousness	3·41	100 ,, ,,
89	Lack of desire to play	3·38	101 ,, ,,
90	Moodiness	3·36	102 ,, ,,
91	Feeling of inferiority	3·31	102 ,, ,,
92	Secretiveness	3·31	102 ,, ,,
93	Obscene notes and stories	3·26	102 ,, ,,
94	Spitefulness	3·25	103 ,, ,,
95	Sullenness	3·19	102 ,, ,,
96	Mocking others	3·18	103 ,, ,,
97	Fearfulness	3·08	105 ,, ,,
98	Cradle courtships	2·90	106 ,, ,,
99	Grouchiness	2·88	106 ,, ,,
100	Truancy	2·78	106 ,, ,,
101	Unsocial	2·64	107 ,, ,,
102	Forgery	2·49	107 ,, ,,
103	Unhappy depressed	2·39	107 ,, ,,
104	Smoking	2·37	107 ,, ,,
105	Temper tantrums	2·24	107 ,, ,,
106	Stammering	2·11	109
107	Heterosexual activity	1·58	None others.
108	Masturbation	1·58	None others.
109	Homosexual activity	1·11	

It will be noticed in the above table that the reliability is given in every case. The reason for this will be understood from the following example. " Desire to show-off " has a mean rating for frequency of 5·90 while " day-dreaming " has a mean rating for frequency of 5·53. The difference in the means is ·37. Is this difference a reliable difference or one that is due to chance? In other words what would be the chances, if the experiment were repeated, of again finding " desire to show off " rated higher in frequency than " day dreaming ? " To determine this reliability necessitated the calculation of the standard deviation and probable error of each of the 109 traits and then determining by the formula given in the footnote* the reliability of the mean rating of any given item with respect to the mean rating of each of the other 108 items. In order to save space, the results only are given in Table III. Where the mean of one trait is said to be reliably higher than the mean of another trait the interpretation is that the chances are 99 out of 100, or greater, that if the experiment were repeated, a difference in the same direction would be found. Thus, by looking up Table III it will be found that the difference in the means of " desire to show off " and " day dreaming " is not significant.

In analyzing the results of Table III an attempt was made to make a comparison with Wickman's results. Out of 109 traits used by this investigation and 50 used by Wickman there were 43 traits listed in common. These 43 traits were listed in rank order in both investigations. The correlation by Spearman's rho method was found to be ·78, which is a high correlation. Whispering is found to be the most frequent form of undesirable behaviour in both investigations. Inattention, carelessness in work, tattling and failure to study, rank high in frequency in both groups. Both groups agree that smoking, obscene notes and stories, temper outbursts, truancy, bullying, masturbation, stealing, resentfulness, impertinence and rudeness, are among the least frequently occurring traits.

A further analysis of the Canadian study, according to the seven groups under which behaviour problems are classified on page 14, reveals some interesting data. The percentage of each of the seven groups found in each quarter of the rating scale is given in Table IV.

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* The measure of reliability was calculated as follows :

$$\text{Measure of reliability} = \frac{D}{P.E._D}$$

where D = the difference of the means

$$\text{and } P.E._D = \sqrt{\frac{(P.E._{\text{dis }a})^2}{N_a} + \frac{(P.E._{\text{dis }b})^2}{N_b}}$$

Measure of reliability equalling 4 was considered reliable.

TABLE IV.

TABLE SHOWING PERCENTAGE OF UNDESIRABLE BEHAVIOUR TRAITS IN EACH QUARTER SECTION OF THE SCALE OF RATING FOR FREQUENCY. (READ ACROSS.)

Groups.	*Percentage found in in lowest quarter section of the scale.*	*Percentage found in 2nd lowest quarter section of the scale.*	*Percentage found in 2nd highest quarter section of the scale.*	*Percentage found in highest quarter section of the scale.*
(1) Violation of General Standards of Morality..........	50	28·58	7·14	14·29
(2) Transgressions against Authority	25	50	25	0
(3) Violations of General School Regulations	28·5	14·3	14·3	42·9
(4) Violation of Classroom Rules	0	16·6	33·3	50
(5) Violation of School Work Requirements	0	10	20	70
(6) Difficulties with Other Children..................	34·4	22·2	22·2	22·2
(7) Undesirable Personality ..	25·39	27·11	30·5	17

While too much should not be made of the divisions into groups since these overlap somewhat, and also because some traits might be classified in more than one group, yet the general trend is plainly seen from Table IV. Seventy per cent of all the undesirable traits classified under " Violation of School Work Requirements " are found in the highest quarter section of the scale of frequency. Likewise 50 per cent of all the undesirable traits classified under " Violation of Classroom Rules " and nearly 43 per cent of " Violations of General School Regulations " are in the highest quarter section of the scale of frequency. The traits listed under the heading " Difficulties with other Children " seem to be scattered throughout each quarter section more uniformly. This is also largely true of " Undesirable Personality Traits." " Gross transgressions against Authority " are not listed under the first quarter section of the scale of frequency, while traits listed under " Violations of Standards of Integrity and Morality " seem to be rated largely in the lower quarter section of the scale of frequency, only 22 per cent being above the Median. The conclusion seems to be that teachers in this investigation regard violations of school work requirements, violation of classroom rules and of general school regulations as being outstandingly more frequent than undesirable personality traits or gross transgressions against authority or the violation of standards of integrity and morality.

Turning to the question of how serious teachers rated these various personality and behaviour traits the result of the ratings on the seriousness scale are given in Table V below.

TABLE V.

TABLE SHOWING RELATIVE SERIOUSNESS OF 109 BEHAVIOUR AND PERSONALITY MALADJUSTMENTS AS RATED BY 167 TEACHERS ON A SCALE OF 20 UNITS.

No.	*Trait.*	*Mean Rating as to Seriousness*	*Reliably more serious than*
1	Masturbation	15·81	6 and all below
2	Heterosexual activity	15·50	7 ,, ,,
3	Stealing	14·82	9 ,, ,,
4	Homosexual activity	14·76	10 ,, ,,
5	Forgery	14·10	12 ,, ,,
6	Lack of Honour	14.00	12 ,, ,,
7	Lying	13·58	15 ,, ,,
8	Obscene notes and stories	13·44	16 ,, ,,
9	Deceitfulness	13·03	17 ,, ,,
10	Lack of ambition	12·84	17 ,, ,,
11	Untrustworthy	12·82	18 ,, ,,
12	Lack of effort	12·49	21 ,, ,,
13	Cheating	12·31	26 ,, ,,
14	Smoking	12·18	31 ,, ,,
15	Lack of interest (school work)	12·10	28 ,, ,,
16	Profanity	11·76	34 ,, ,,
17	Bullying	11·39	37 ,, ,,
18	Inattention	11·39	37 ,, ,,
19	Meanness	11·35	37, 39 ,, ,,
20	Impertinence	11·25	37, 40 ,, ,,
21	Careless posture	11·21	37, 39 ,, ,,
22	Carelessness	11·06	37, 39 ,, ,,
23	Lack of concentration	11·00	40 ,, ,,
24	Marking lavatories and walls	10·99	42 ,, ,,
25	Failure to confess fault	10·97	42 ,, ,,
26	Disobedience	10·76	42 ,, ,,
27	Destroying materials	10·75	42 ,, ,,
28	Indifference	10·74	42 ,, ,,
29	Lack of confidence, own ability	10·67	42 ,, ,,
30	Disregard rights of others	10·61	43 to 48, 50 ,, ,,
31	Idleness and dawdling	10·57	42 to 48, 50 ,, ,,
32	Laziness	10·50	45 to 48, 50 ,, ,,
33	Temper tantrums	10·29	54 ,, ,,
34	Lack of desire for play	10.23	54 ,, ,,
35	Too dependent	10.22	52 ,, ,,
36	Unhappy, depressed	10·17	54 ,, ,,
37	Untidiness in work	9·88	54 to 56, 58 ,, ,,

TABLE V—*continued.*

No.	*Trait.*	*Mean Rating as to Seriousness*	*Reliably more serious than*
38	Stammering	9·79	64 and all below
39	Spitefulness	9·76	62 ,, ,,
40	Lack of group spirit	9.73	60 ,, ,,
41	Sullenness	9·67	62, 64 ,, ,,
42	Forgetting	9·41	65, 67, 69 ,, ,,
43	Unsportsmanship	9·28	70 ,, ,,
44	Cowardly	9·22	71 ,, ,,
45	Overcritical others' faults	9·20	70 ,, ,,
46	Obstinacy	9·09	72 ,, ,,
47	Untidiness of person	9·04	72 ,, ,,
48	Truancy	9·03	75 ,, ,,
49	Feeling of inferiority	9·01	81 ,, ,,
50	Conceit	8·96	73 ,, ,,
51	Stubbornness	8·9	75, 77 ,, ,,
52	Nervousness	8·83	77, 78, 80 ,, ,,
53	Evades punishment	8·82	77, 78, 80 ,, ,,
54	Resentful	8·64	81 ,, ,,
55	Failure to join group	8·61	84, 86 ,, ,,
56	Impoliteness	8·58	84, 86 ,, ,,
57	Self pity	8·58	86 ,, ,,
58	Jealousy	8·56	84, 86 ,, ,,
59	Lack of emotional control	8·50	88, 90, 92 ,, ,,
60	Thoughtlessness	8·49	84 ,, ,,
61	Domineering	8·41	90, 92 ,, ,,
62	Erratic	8·29	92 ,, ,,
63	Grouchiness	8·24	93 ,, ,,
64	Rudeness	8·20	93 ,, ,,
65	Tardiness	8·17	93 ,, ,,
66	Oversensitiveness	8·16	94 ,, ,,
67	Interrupting	8·13	94 ,, ,,
68	Unsocial	8·09	94 ,, ,,
69	Sauciness	8·03	94 ,, ,,
70	Disorderliness	7·88	95 ,, ,,
71	Moodiness	7·79	96 ,, ,,
72	Meddlesomeness	7·73	96 ,, ,,
73	Noisiness (halls and lines)	7·57	97 ,, ,,
74	Secretiveness	7·54	99 ,, ,,
75	Gossiping	7·49	99 ,, ,,
76	Roughness	7·48	99 ,, ,,
77	Mocking others	7·41	100 ,, ,,
78	Self-conscious	7·41	99 ,, ,,
79	Too suggestive	7·40	100 ,, ,,
80	Sulkiness	7·35	99 ,, ,,
81	Peevishness	7·35	99 ,, ,,
82	Restlessness	7·35	99 ,, ,,
83	Persistency	7·28	101 ,, ,,
84	Day dreaming	7·22	101 ,, ,,
85	Fearfulness	7·21	101 ,, ,,
86	Timidity	7·20	100 ,, ,,
87	Overconfident	7·17	101 ,, ,,
88	Quarrelsomeness	7·14	101 ,, ,,
89	Whispering	7·14	101 ,, ,,
90	Loquaciousness	7·11	101 ,, ,,
91	Speaking aloud in school	7·08	102 ,, ,,

TABLE V—*continued.*

No.	*Trait.*	*Mean Rating as to Seriousness*	*Reliably more serious than*
92	Excitable	7·07	101 and all below
93	Boastful	6·91	102 „ „
94	Officiousness	6·91	102 „ „
95	Feeling of superiority	6·62	103, 105, 107 „ „
96	Craving for sympathy	6·51	107 „ „
97	Silliness and giggling	6·41	108 „ „
98	Fighting	6·24	108 „ „
99	Boisterousness	6·14	109 „ „
100	Tattling	6·03	109 „ „
101	Inquisitiveness	5·72	None others
102	Impulsive	5.70	109 „ „
103	Desire to show off	5·40	None others
104	Chewing gum	5·39	„ „
105	Overimaginative	5·38	„ „
106	Cradle courtships	5·33	„ „
107	Shyness	5·22	„ „
108	Overconscientiousness	5·01	„ „
109	Teasing	4·57	„ „

In analyzing the results of Table V, comparison will first be made with Wickman's results. It was found that 46 traits were common to both studies. The ratings of these traits were correlated by the Spearman's rho method and a coefficient of ·83 was obtained, which is a very high correlation.

It is interesting to note that sex offences, stealing and lying, occupy the first five positions in both investigations and that shyness is rated at the bottom of both lists. The traits of bullying, cheating, disobedience, unhappiness, resentfulness, cowardly, unsocial, day dreaming, inquisitiveness and whispering are remarkably close in rank order in both lists, while laziness, tattling, and shyness occupy exactly the same relative order. The Canadian group ranks truancy, rudeness, and quarrelsomeness as considerably less serious than the American group. The latter ranks the traits of over-critical of others, sensitiveness, inattention, sullenness, and smoking as less serious than the Canadian group. While it might be hazardous to give reasons for these differences the writer is inclined to think that the difference in the size and character of the cities concerned account for some of the variations noted above. For instance in the small Canadian city where there are no great extremes of poverty and wealth, and which is not industrial in character, truancy is a very minor problem.

With regard to the reliability of the results given in Table V with respect to seriousness, the reliability was calculated in the same way as for Table III, as described on page 19. The results in Table V are to be read thus: Trait No. 31 (Idleness) is reliably more serious than traits number 42 to 48, 50, and all below, but is not reliably more frequent than trait numbers 1 to 42 and 49.

An analysis of the results of the Canadian study reveals some interesting data. The percentage of each of the traits of the seven groups found in each quarter section of the scale for seriousness is given in Table VI below.

TABLE VI.

TABLE SHOWING PERCENTAGE OF UNDESIRABLE PERSONALITY AND BEHAVIOUR TRAITS IN EACH QUARTER OF THE RATING SCALE FOR SERIOUSNESS. (READ ACROSS.)

Groups.	*Percentage found in lowest quarter section of the scale.*	*Percentage found in 2nd lowest quarter section of the scale.*	*Percentage found in 2nd highest quarter section of the scale.*	*Percentage found in highest quarter section of the scale.*
(1) Violations of General Standards of Morality, etc.	7·14	0	0	92·86
(2) Transgressions against Authority	0	25	25	50
(3) Violations of General School Regulations	16·7	33·3	16·7	33·3
(4) Violations of Classroom Rules	42·8	28·6	0	28·6
(5) Violations of School Work Requirements	0	10	40	50
(6) Difficulties with Other Children	45·5	22·2	22·2	11·1
(7) Undesirable Personality Traits	32·2	32·2	32·2	3·4

The general trend may be gleaned from the above table. Nearly 93 per cent of the traits listed under "Violations of General Standards of Morality" are listed in the highest quarter of the rating scale for seriousness, as are 50 per cent of the traits listed under "Transgressions against Authority," 50 per cent of those listed under "Violations of School Work Requirements," 33⅓ per cent of the traits listed under "Violations of General School Regulations," and 28·6 per cent listed under "Violations of Classroom Rules." Only 11·1 per cent of "Difficulties with other Children" and 3·4 per cent of the group "Undesirable Personality Traits" are so listed. It will thus be seen that in this study, the teachers' emphasis on the seriousness of behaviour and personality traits lies in the violations of general standards of morality, or transgressions against authority, on various violations of school and classroom rules, and on violations of school work requirements, rather than on a pupil's maladjustments in his relations with other children or on any form of undesirable personality trait.

If Table VI (Seriousness) be compared with Table IV (Frequency) it will be noticed that " Violations of general standards of morality " and " Transgressions against Authority " are much more serious than frequent, while with the remaining groups the seriousness ranks lower than the frequency.

In order that a comparison might be made with Wickman's investigation, the present study is summarized below :

Immoralities and Dishonesties	Reliably more serious than	Violations of Orderliness in classroom and application to school work	Reliably more serious than	Undesirable Personality Traits

Wickman's findings were as follows :

Immoralities Dishonesties Transgressions against Authority.	Reliably more serious than	Violations of Orderliness in classroom and application to school work	Reliably more serious than	Extravagant Aggressive Personality Traits	Reliably more serious than	Recessive Withdrawin Personality Traits

The two studies, therefore, are in agreement except that the Canadian study does not rate undesirable personality traits in the same way. The Canadian group do not rate aggressive personality traits reliably higher than recessive personality traits. Rather they rate feelings of inferiority, self-pity, and over-conscientiousness as reliably higher for seriousness than feelings of superiority, desire to show off and boisterousness.

In addition to getting the reactions of teachers, Dr. Wickman also carried out an investigation in which he sought to get the reactions of 30 mental hygienists, all of whom were engaged in clinical work. The results showed a striking disagreement with the teachers' ratings. Indeed, in many respects the mental hygienists reversed the rating of the teachers. Their rating was as follows ;

Withdrawing Recessive Personality Traits	Reliably more serious than	Dishonesties Cruelty Temper Tantrums Truancy	Reliably more serious than	Immoralities Violations of school work requirements Aggressive behaviour traits	Reliably more serious than	Transgress against Authority Violations Orderliness in Class

Statistically, the ratings of the teachers of the American study correlated with those of the mental hygienists negatively, viz., —·125. The ratings of the Canadian teachers correlated with the mental hygienists also negatively, viz., —·118.

VI.—SUMMARY AND CONCLUSION.

(1) A questionnaire was submitted to 167 elementary school teachers asking them to list all the forms of personality and behaviour maladjustments they had encountered in school children.

(2) The items submitted in this first questionnaire were classified according to the following groups: Violations of general standards of morality, transgressions against authority, violations of general school regulations, violations of classroom rules, violations of school work requirements, difficulties with other children, and undesirable personality traits, and the results analyzed and compared with an American study by Wickman.

(3) A second questionnaire was submitted in the form of a rating scale in which the same group of teachers were asked to rate 109 personality and behaviour maladjustments with respect to frequency of occurrence and also with respect to seriousness.

(4) Table III and IV summarize the ratings for frequency and reveal that the teachers in this investigation regard violations of school work requirements, violations of classroom rules and of general school regulations as outstandingly more frequent than undesirable personality traits, gross transgressions against authority or the violation of standards of morality and integrity.

(5) The results of the rating for frequency were found to be in substantial agreement with an American study made by Wickman.

(6) Tables V and VI summarize the ratings of the teachers for seriousness and reveal that teachers' emphasis in this regard is upon violations of general standards of morality and integrity, transgressions against authority, violations of school and classroom regulations and school work requirements rather than on pupils' difficulties with other children or on undesirable personality traits.

(7) The results were compared with Wickman's study and agreement was found except that Wickman found that aggressive personality traits were rated reliably higher than recessive personality traits. The ratings of the Canadian group could not be distinguished in this way, undesirable personality traits as a group being least serious.

(8) The ratings of the Canadian group for seriousness were compared with Wickman's findings for a group of mental hygienists, who almost reverse the ratings of the teachers.

(9) Since the mental hygienists, who are dealing clinically with problem children and may be presumed to be experts in this field, react very differently as to the seriousness of personality and behaviour maladjustments of school children, it would seem that educationists should seriously review our present attitudes towards school, classroom and curriculum organization and in particular the need for special training for teachers in the principles of mental hygiene. This will involve a discussion of problems relating to the philosophy of education, the psychology of the native equipment of the child, the psychology of learning, the psychology of individual differences, as well as every phase of school and class room management.

(10) If the view of the mental hygienists be correct, then the training of teachers in training colleges must include more of the mental hygiene point of view. The teacher must be led to understand, in terms of the child's own development and adjustment to life, the importance of attention to the development of wholesome personality and behaviour traits, instead of the more purely intellectual elements. Instead of the traditional view that it is the business of the teacher to see that the child absorb so much arithmetic, history and geography, there must be substituted the view that a successful and happy adjustment to life depends only in part on intellectual achievement. Rather it depends to a very great degree on the harmonious development of the emotional and will qualities. A new ideal of mental health with well balanced personality traits must be substituted for the ideal of rapid advancement in purely intellectual knowledge. Teachers must be trained in the diagnostic point of view in education, in order that underlying emotional or other causes of personality and behaviour problems may be treated scientifically, rather than by the " blanket " method of severe discipline, which was applied not so much to underlying causes as to outward symptoms of maladjustments.

(11) Since teachers are servants of the public, they can succeed in bringing the mental hygiene point of view into the classroom only in so far as an enlightened public opinion conceives of their task as something more than cramming for examinations and permits and indeed demands that they shall teach " the whole child." Educators, sociologists, and mental hygienists must, therefore, help to enlighten the public along the lines of mental health.

RÉSUMÉ.

LES AVIS DES PROFESSEURS QUANT AUX DIFFICULTÉS DE COMPORTEMENT CHEZ LES ÉLÈVES.

Pour commencer des recherches sur les problèmes de la personnalité et du comportement chez les enfants on fit parvenir à des professeurs un questionnaire, afin de découvrir ce qui constitue, à leur avis, un enfant difficile, quelle est la fréquence des différentes manifestations des problèmes, et quelle est l'importance relative de ces manifestations. On trouva que la violation des obligations imposées par le travail de l'école, des règles de classe et d'école en général étaient plus fréquentes que les traits de caractère peu désirables, ou les grosses transgressions contre l'autorité.

Quant à l'importance relative, on considère le mépris du niveau accepté de la moralité, les transgressions contre l'autorité, et la violation des obligations du travail, et des règles de classe plus graves que les traits peu désirables de personnalité. On établit une comparaison avec une étude américaine par Wickman, qui trouva que les hygiénistes mentaux renversaient presque complètement le classement de l'importance formulé par les professeurs. On signale les conclusions implicites, qu'il faudrait enseigner aux professeurs les principes de l'hygiène mentale et leur faire comprendre la nécessité, dans l'éducation, d'un idéal de la santé mentale.

ZUSAMMENFASSUNG.

REAKTIONEN VON LEHRERN AUF SCHWERERZIEHBARKEIT VON SCHULKINDERN.

Zum Zwecke der Erforschung der Persönlichkeits-und Betragensprobleme der Kindheit, wurden Fragebogen an Lehrer geschickt, um zu erfahren, was ihres Erachtens ein Kind zu einem schwererziehbaren Kinde macht, wie oft verschiedene Arten von Störungen vorkommen und wie ernst diese sind, wenn sie vorkommen. Verstösse gegen die verlangte Schularbeit, gegen die Klassenordnung und die allgemeinen Vorschriften zeigten sich häufiger als nicht wünschenswerte Charakterzüge oder grobe Ausschreitungen gegen die Autorität. Was die schwere der Vergehen angeht, so fand man dass Vergehen gegen die allgemeinen moralischen Masstäbe, Ausschreitungen gegen Autorität und Nichtbeachtung der allgemeinen Erfordernisse der Schularbeit und der Klassenordnungen bedenklicher waren als nicht wünschenswerte Charaktereigenschaften. Man stellte Vergleiche mit einer amerikanischen Untersuchung von Wickman an, der herausfand, dass Seelenheilkundige die Schwere der Fälle mehr oder minder umgekehrt einschätzten als die Lehrer es taten. Es wird darauf hingewiesen, dass die Lehrerschaft einer Ausbildung in den Grundsätzen der Seelenheilkunde und dass die Erziehung eines Ideals geistiger Gesundheit bedarf.

BEHAVIOUR AND PERSONALITY DIFFICULTIES IN SCHOOL CHILDREN.

BY BERNICE STEWART MCFIE.
(*From the Department of Psychological Medicine, Guy's Hospital.*)

I.—Problems.
II.—General plan of the investigation.
III.—Method of investigation and classification of symptoms.
IV.—Analysis of results.
V.—Comparison with types of cases attending hospital.
VI.—Value of school reports.
VII.—School and hospital treatment.
VIII.—Conclusions.

I.—PROBLEMS.

THIS report describes a survey of Personality Difficulties seen in school children. It might equally well be entitled " Psychiatric Service and the needs of the Community," since the investigation seeks to answer some of the many questions in this domain.

The Department of Psychological Medicine of Guy's Hospital will this year be making its third annual survey of all patients who were discharged or ceased attendance two years previously. Information concerning diagnosis and treatment is also increasingly accessible from other hositals and clinics. Hence the further step of relating this experience to the needs of the community becomes progressively more important, and it seemed advisable to formulate definitely some of the questions it was desired to solve, even though, at this stage, the answers could be only provisional.

The first question concerns the type of case which reaches the psychiatrist. Experience with adult patients shows that character traits that play an important part in subsequent breakdowns can usually be traced back to childhood. Children with similar character traits reach the psychiatrist ; but the question is whether the children singled out for treatment are not, in an unduly high proportion, those who are a nuisance to parents or teachers rather than those making unsatisfactory social or personal adjustments. In the present state of limited psychological understanding this is to be expected ; is it in fact the case ?

This obviously important question cannot be answered without discovering to what extent the different types of Behaviour Disorder and Personality Difficulty exist in our child population. This therefore became our second question, from which the third followed almost automatically: how far is it possible for teachers in charge of large classes to recognize those character traits which we know can, if not rectified, prevent efficiency and happiness in later life?

The fourth and final question concerns the results of treatment, viz., which type of problem yields most readily to the treatment possible within the limits of school organization? It is fully realized that a distinction should here be drawn between treatment and investigation into the cause of the disturbance. Although treatment may be possible in the school, the detailed study of the family background that is necessary to the elucidation of many problems is beyond the scope of the teaching staff. A clear-cut answer could scarcely be expected, but information of interest was obtainable and therefore is included in this survey.

II.—GENERAL PLAN OF THE INVESTIGATION.

These questions could only be answered by an enquiry carried out throughout the school and fortunately it was possible for us to enlist the co-operation of a number of London elementary school head teachers.

To be of real value the investigation had to cover a large group of children. Individual home investigation on this scale was not practical even if it could have yielded reliable information. Schools offered the advantage of large groups of children assembled for much of their time under trained observers, the teachers, who could give accurate and unbiased reports. It must be borne in mind throughout this report that the teachers have not the opportunities of psychiatrists in this field, and their training is of course different.

Some problems, it is true, do not appear during school hours. Night terrors, bed wetting, food fads, can only be known to the teacher through reports from parents or social workers. The same applies to overt behaviour disorders such as stealing, tantrums, and cruelty, which may appear more readily at home than under the more favourable conditions at school. To this extent the evidence obtained through this survey is incomplete and it must be borne in mind that the symptoms here described are, in the main, only those observed in school.

The restriction of the investigation to elementary schools was primarily due to the time of year. For the convenience of the primary schools, where promotion takes place at Easter and in October, September was chosen. For other schools this is the beginning of the scholastic year and the teaching staff are hardly acquainted with their own pupils. It was therefore decided not to extend the enquiry at present. In order, meanwhile, to make the group of children as representative as possible, schools drawing from a great variety of districts were chosen. The head teachers of four boys' and four girls' schools were approached, touching the clerical grades at one end of the social scale and the rough casual labourer at the other. The extensive reorganization of schools during the past few years, in conformity with the recommendations of the Hadow Committee, limited the choice, if schools were to be avoided where the teachers had only known the children a relatively short period. We were most fortunate, however, in that every head teacher approached immediately offered full co-operation. Both head teachers and assistants gave of their time and energy without stint, and thanks are due to them for making the investigation not only interesting but enjoyable.

The question as to treatment in the school made it necessary to select the older age group for this investigation and the children covered are those whose date of birth fell between September, 1918, and September, 1920; that is all those children, who at the time of the investigation were between the ages of 12 and 14.

III.—METHOD OF INVESTIGATION AND CLASSIFICATION OF SYMPTOMS.

Our aim was first of all to discover the proportion of children between the ages of 12 and 14 who showed or had shown any of those symptoms which indicate personality deviations, or who showed behaviour or habit disorders, or were failing in some way in their school work but could not be said to be doing so through any innate intellectual deficiency.

The terms "Personality Deviation, Behaviour Disorders, Habit Disorders, and Scholastic Difficulties" represent a classification that was found to be convenient in analysing cases treated in the Department of Psychological Medicine of Guy's Hospital. The division is admittedly arbitrary since no clear line of division can be drawn where the whole personality of the individual is concerned. The disorders of personality represent what might be called traits of temperament and character occurring either singly or in groups. The behaviour disorders refer to actual conduct of the more aggressive kind. The habit disorders are those which involve only one or two segments of the body, so to speak, and unlike the behaviour disorders are not aggressively directed towards other persons in any obvious way. Scholastic difficulties represent any failure in school work which cannot be attributed to defective intelligence.

The hospital classification includes six other groups with which we are not concerned in the enquiry. Epilepsy, Mental Deficiency, and Mental Disorders attributable to physical disease were definitely not included in this survey. Psychoses could only be detected after full psychiatric investigation, but there is no reason to think that there were any psychotics in the group covered by this survey. Psychoneuroses such as hysteria and phobias, and disorders of the " glycopenic " variety such as migraine and night terrors, were so rare in the school record as hardly to warrant separate headings and the few cases that were found were included under the existing headings, that seemed most appropriate.

The following are the headings used together with symptoms suggested for the guidance of the teachers who co-operated in the investigation :

Personality Deviations (timidity, sensitiveness, lack of sociability, day dreaming, emotional instability, etc.).

Behaviour Disorders (truancy, wandering, lying, stealing, begging, cruelty, sex misdemeanours, etc.).

Habit Disorders (nail biting, thumb sucking, incontinence, habit spasms, masturbation, stammering, etc.).

Scholastic Difficulties other than those due to mental defect.

Personality Deviations presented the greatest difficulty. Some teachers had not thought of such symptoms as self-consciousness, timidity, or even day-dreaming very definitely as character difficulties, and the children showing these characteristics might well be passed over as completely satisfactory. More than one teacher made remarks such as " a thoroughly nice child " and only after a pause added " but very self-conscious."

In fact it was anticipated that to issue a form for completion without personal discussion of each case would not yield satisfactory results, however detailed the accompanying notes. At each school the register was gone through with both head teacher and the assistant in charge of the child at the time. In some schools the head teacher and assistant were present together but in others separately. Only after this preliminary survey were definite questionnaires filled in by the teachers. Every effort was made to avoid the kind of pitfall referred to by one head master who pointed out that of necessity an atmosphere of awe surrounded the head's room which would be conducive to nervousness in boys not otherwise timid and that for this reason the head master might not be the best judge of these symptoms. It was in order to avoid this type of difficulty, and also to draw upon the more detailed knowledge that the assistants might be expected to have, that the latter were consulted in the investigation.

But even with this personal interview uniformity of standard was not achieved. No attempt was made to influence judgments and the investigator was conscious of some very pronounced divergences of opinion which are clearly reflected in the figures. The first moments of the interview were sometimes misleading, however. The head teacher whose first reaction to the explanation of the nature of the enquiry was to think that there were no problems in his school did not find a noticeably smaller proportion than the head teacher who was inclined to think that all the children in his school were problems. Perhaps they were both on their guard not to allow what they recognized as the mood of the moment to influence their judgments.

A copy of the form that was subsequently filled in for all those who had been noted as showing any difficulties is given in the Appendix.

IV.—ANALYSIS OF RESULTS.

The number of children between the ages of 12 and 14 in the schools included in the investigation were : Girls, School A 128, School B 76, School C 110, School D 57, making a total of 371 girls ; Boys, School E 116, School F 91, School G 43, School H 76, making a total of 326 boys ; boys and girls together totalling 697.

Of these children the number who were found to have one or more of the symptoms referred to were 322, or 46.2 per cent ; a proportion far higher than was anticipated by the investigator and probably higher than anticipated by the teachers who co-operated in the enquiry.

The first task was to classifiy the returns made on the lines already indicated. Table I gives the incidence of Personality Deviations, Behaviour Disorders, Habit Disorders, and Scholastic Difficulties. The same children appear inevitably in different columns but in no case has the same child been counted twice under one heading even though there may have been a number of symptoms.

TABLE I.

PERCENTAGE OF CHILDREN IN EACH SCHOOL SHOWING SOME TYPE OF DISORDER.

School.	*Personality Deviations.*	*Behaviour Disorders.*	*Habit Disorders.*	*Scholastic Difficulties.*	*Percentage of children with some type of disorder.*
Girls A (128)	25	20	19	10	47
,, B (76)	13	8	25	9	37
,, C (110)	10	4	24	4	36
,, D (57)	33	23	26	12	64
Boys E (116)	18	10	28	1	40
,, F (91)	35	22	30	8	56
,, G (43)	30	23	14	0	46
,, H (76)	37	20	25	8	50
Percentage for the whole group	25	16	24	6	46

The more detailed tables which follow (Tables II, III, IV, and V) throw light on the difficulties encountered in conforming with any classification. The division between Behaviour Disorders and Personality Deviations on the one hand, and Scholastic Difficulties on the other is, as we have already said, arbitrary. There are, of course, a great many children who come under two headings, who, e.g., both steal and are solitary. They present no difficulty. But on the other hand, if the child is reported to be a bully and quarrelsome a decision has to be made. We have in fact listed this as a Behaviour Disorder but not without realizing that, with almost equal right, we might have considered this a Personality Deviation. Again as to the characterization " lazy," our first inclination was to call this a Behaviour Disorder, but some schools have reported a number of children as unable to concentrate on their work, and from the fact that few teachers use both terms there seems to be little doubt but that they are to some extent interchangeable. Laziness has therefore been included in the list of Scholastic Difficulties.

Habit Disorders are for the most part clear and unmistakable and there is not likely to be any difference of opinion except perhaps in the case of a very slight stammer. The figure in this column, it will be noticed, is also the steadiest. One group of boys, it is true, has only 14 per cent and one of girls 19 per cent, but apart from this the range is from 24 per cent to 30 per cent. With comparatively few exceptions the habit referred to is nail biting.

It is not possible in this report to record the words used by each teacher although this would be of interest. Grouping has been necessary in the interests of space as well as in the interests of clarity. The difficulty of attaching exactly the same meaning to the same words has already been referred to and the headings to the following tables probably require no further explanation.

TABLE II.

TYPES OF PERSONALITY DEVIATIONS : PERCENTAGE DISTRIBUTION AMONG THE WHOLE GROUP.

Sensitive, Self-conscious, Timid, Nervous.	*Solitary, Unpopular Very Quiet.*	*Day-dreaming*	*Emotionally unstable, Tempers.*	*No self-confidence, Depressed.*	*Lacking emotion, Discouraged.*	*Sullen, Resentful of authority.*
13·7	6·5	3·8	3·7	1·3	·5	6·1

TABLE III.

TYPES OF BEHAVIOUR DISORDER : PERCENTAGE DISTRIBUTION AMONG THE WHOLE GROUP OF CHILDREN.

Bullying, Quarrelling.	*Clowning, In limelight.*	*Shifty, Unstable.*	*Wandering, Truancy.*	*Restless, Fidgety.*	*Lying, Stealing, Begging.*	*Babyish.*	*Others.*
2·4	2·0	2·4	·5	2·1	3·4	1·9	2·3

TABLE IV.

TYPES OF HABIT DISORDER : PERCENTAGE DISTRIBUTION AMONG THE WHOLE GROUP OF CHILDREN.

Nail-biting, Finger-picking.	*Stammer.*	*Masturbation.*	*Habit Spasm.*	*Enuresis.*
22·2	1·2	·4	·4	·3

TABLE V.

SCHOLASTIC DIFFICULTIES: PERCENTAGE DISTRIBUTION AMONG THE WHOLE GROUP OF CHILDREN.

Lazy, Erratic.	*No Interest.*	*Reading Difficulty.*	*Arithmetic Difficulty.*	*Very Slow.*
4·4	·4	·8	·4	·3

V.—COMPARISON WITH TYPES OF CASES ATTENDING HOSPITAL.

Without exaggerating in any way the importance of figures that cannot be calculated with mathematical accuracy, it seems clear from these tables that Personality Difficulties are present in our school children to a disturbing extent. This cannot but increase our interest in the part that the school can play in adjustment as well as the work being done in the various clinics and hospital departments.

In the above tables the number of children showing the different types of disorder have been given as percentages of the whole body of children between the ages of 12 and 14 at these schools. In order to compare them with the hospital group these are now expressed in Table VI as percentages of the problem group only; a re-arrangement which leaves the relative position of the categories the same but multiplies each figure by a little more than two.

TABLE VI.

INCIDENCE OF VARIOUS TYPES OF DISORDER IN THE GROUP OF SCHOOL CHILDREN PRESENTING SOME TYPE OF DIFFICULTY.

Personality Deviations.	*Behaviour Disorders.*	*Habit Disorders.*	*Scholastic Difficulties.*
56%	33%	56%	14%

While it must be remembered that the hospital diagnosis is made after careful and detailed study of the children in their homes and at play as well as at school, it must also be remembered that the hospital statistics are not co-terminous with those of this survey. Minor symptoms, when occurring in a minor degree of intensity, are often not noted when they are clearly subsidiary to other more serious problems. Nail biting, for instance, which makes up the bulk of the Habit Disorder group in the schools, is often not noted at hospital when it occurs only in a minor degree and is regarded as a consequence of the personality disorder for which the child was referred.

TABLE VII.

PERCENTAGE OF CHILDREN REFERRED TO HOSPITAL IN 1930, 1931, AND 1932 (7 MONTHS) WHO SHOWED VARIOUS TYPES OF DISORDER.

	Personality Deviations.	*Behaviour Disorders.*	*Habit Disorders.*	*Scholastic Difficulties.*
Total Hospital Group	19	42·5	29·4	12·1
Children between ages of 12 and 14	26·1	41·7	26·1	16·5

Tables VI and VII form a striking contrast, even after allowing for a very wide margin of error in Table VI and the difference in method of classification.

The hospital figures for Habit Disorder should, no doubt, be weighted up to balance the omission of all degrees of nail biting. On the other hand, 50 per cent of this group were enuretics, and many of the school children would have been found to suffer from this had they been questioned.

Personality Deviations are more liable to be overlooked, one would imagine, by the teacher than by the psychiatrist with his greater opportunities for detailed study. The figures in the Personality Deviations column may therefore be expected to be more complete in the hospital records than in those of the schools.

Time has not allowed a re-classification of the hospital cases, but it is clear even from these figures that active Behaviour Disorders reach the psychiatrist much more readily than the frequently more serious but less aggressive Personality Deviations.

VI.—VALUE OF SCHOOL REPORTS.

To what extent the reports made by the teaching staffs can be relied upon can perhaps best be dealt with at this stage of the report. It will have been remarked that the proportion of children noted for Personality Deviations ranges from 10 per cent to 37 per cent ; a variation that would not be affected by the combination of Behaviour Disorders with Personality Deviations since those schools which show a low return in the one also show a low return in the other. It is natural to ask whether this discrepancy is due to a difference in the standard of the teachers or to some other cause.

The social differences between the schools does not provide the answer. The schools have been arranged in Table I in the order of their social grading. Girls' School A corresponds to the Boys' School E, B to F, and so on ; A drawing from the best and D from the worst district. Reference to the table will demonstrate that while one of the poorest districts apparently yields the largest proportion of Personality Deviations, here the correlation ends and another explanation must be sought.

There seem three possible reasons for the wide divergence : (1) That some local factor other than social status is playing an important part ; (2) that some schools are more successful than others in overcoming character difficulties, whether this is to be attributed to the personality of the staffs or to the methods employed, or that some types of school organizations have the effect of throwing problems into relief less than others ; (3) that the teachers who reported on the children varied in their estimate of what may be looked upon as evidence of personality difficulties.

It is impossible to judge of the spirit of the district with any degree of accuracy, and in spite of an inclination to think this a potentially important factor it cannot be discussed here. In fact, the third is the only point upon which the investigators feel able to express an opinion.

Perhaps the most reliable conclusion can be drawn from a study of the column showing the incidence of Habit Disorders. There is less room for individual differences of judgment where habits are concerned than is the case with other symptoms. Over 92 per cent of this group were nail biters whose hands could be examined by the teachers. Arranging the schools in the increasing order in which they show Personality Deviations we have given the corresponding percentage of children with Habit Disorders followed by the percentage of this last group who, apparently, gave no other indication of instability.

TABLE VIII.

School.	*Percentage of children with Personality Deviations.*	*Percentage of children with Habit Disorders.*	*Percentage of this last group showing no other symptoms.*
C	10	24	92
B	13	25	68
E	18	28	59
A	25	19	42
G	30	14	17
D	33	26	—
F	35	30	33
H	37	25	16

Assuming Habit Disorders to be symptoms in many instances of an anxiety state, a relatively high proportion of this group would be expected to show other symptoms. The fact that one school reports no other indication of instability in 92 per cent of its Habit Disorder cases, while in the reports of another school this symptom is in every case combined with one or more others certainly suggests that the standard of observation varied. The close correlation between the one symptom child and the absence of Personality Deviations further suggests that, given the same standard, the great discrepancy in the Personality column would largely disappear.

Whilst it is not maintained that Habit Disorders do not occur without other indications of instability, it seems unlikely that this would be so in such a high proportion of cases in a few schools and not in others. It is interesting to see that this analysis of the returns made supports the investigator's consciousness of variation in standards of interpretation mentioned above.

VII.—SCHOOL AND HOSPITAL TREATMENT.

No enquiry was made in the infants' schools from which these children were drawn and had it been attempted reliable information could scarcely have been obtained from teachers who had not had these particular children under their observation for over five years. The questionnaire, however, included an enquiry as to the time when the problem was first noticed, and the replies are significant. It may be suggested that human nature would predispose the teaching staffs to make the problem date back beyond admission to their school. This is possible, although it was not the impression received by the investigator.

The following table shows the proportion of cases in which the problem was noticed on the child's admission to school. The age of admission was usually 7+ but in cases transferred from other schools a later age. High as is the proportion recorded, it would probably be higher if we assumed that the nail biters, who form the bulk of the unclassified group, already had this habit when admitted to school.

TABLE IX.

School and number of children.	*Number of problems first noticed on admission.*	*Number of problems noticed soon after admission.*	*Number of problems noticed later.*	*Number of problems not classified.*
A (128)	41	9	8	5
B (76)	13	1	2	12
C (110)	15	—	1	24
D (57)	16	11	8	2
E (116)	17	1	11	18
F (91)		(*not available*).		
G (43)	8	—	6	6
H (76)	19	1	1	17

One head teacher suggested that a possible source of strain might be the very wide divergence between the home and the school standards. It cannot be denied that there might well be some truth in this, but it is not a conclusion that we could draw from the analysis of the report received from the schools. The fact that in the majority of cases the personality deviations were first noticed either on admission or shortly after suggests that the problem has an earlier origin.

This does not, of course, show the effect that school handling has on the children. One of the questions that we asked ourselves was which type of problem yielded most readily to treatment possible in the ordinary school setting. For this reason the schools were asked to say in each case whether the problem had been successfully cleared up, whether it had improved or whether it persisted. We realized that there was room for wide divergence of opinion in arriving at this estimate, but we had not anticipated the further difficulty that arose through the fact that the majority of the children showed more than one type of symptom and that the teachers' remarks as to improvement were in most cases general statements which had to be taken to cover all the symptoms. In view of this we have given in Table X the teachers' estimate of improvement of problems as a whole, and not for each class separately. (Table XI gives a detailed analysis for the interest of readers but with an emphatic warning that the figures should not be considered exact.) We have further omitted from the group considered in Table X all habit disorders. Two schools noted improvement in nail biting but the majority of teachers appear to have reported that the habit persisted if it existed at all, without making any comment as to improvement. This was possibly because the habit had not been specifically noticed before the investigation.

TABLE X.

School.	*Percentage of cases in which problem persisted.*	*Percentage which showed some improvement.*	*Percentage in which problem cleared up.*
A	57	35	8
B	73	20	7
C	50	50	—
D	27	73	—
E	69	24	7
F		(*not obtained*).	
G	53	47	—
H	63	37	—

TABLE XI.

SCHOOL CHILDREN SHOWING VARIOUS TYPES OF DIFFICULTY CLASSIFIED ACCORDING TO RESULT OF SCHOOL HANDLING.

School.	*Personality Deviations.*			*Behaviour Disorders.*			*Habit Disorders.*			*Scholastic Difficulties.*		
	A	B	C	A	B	C	A	B	C	A	B	C
A	3	15	14	—	10	16	—	13	24	1	3	6
B	1	2	8	—	1	6	—	1	18	—	1	4
C	—	6	6	—	3	—	—	1	25	—	—	3
D	—	24	8	—	9	3	—	12	3	—	4	2
E	1	6	13	1	4	8	1	11	22	—	1	—
F	—	6	7	—	2	4	—	1	4	—	—	1
G					(*Not obtained*).							
H	—	12	16	—	5	10	—	6	12	—	2	4
TOTAL	5	71	72	1	34	37	1	45	108	1	11	20

A.—Difficulty cleared up completely.
B.—Difficulty cleared up partially.
C.—Difficulty persisted.

N.B.—Owing to the fact that some children presented more than one type of difficulty the total gives 416 while the actual number of children concerned is 322.

It will be remarked that memory plays a large part in estimating improvement and that this is borne out by the figures, since the School D, which reported the largest proportion of problems, also reported the largest number of improvements. We feel that in fact where there is so much room for error in the estimates both on the part of the teaching staffs and on the part of the investigator, only the broadest statements are possible. After scanning these figures we can say that very few problems are cleared up completely, and that apparently in the bulk of cases no improvement can be detected in the child's school career. Beyond this we should not be prepared to go.

In Table XII the corresponding results of hospital treatment are given. Both in 1930 and 1931 a survey was made of all the children who had received treatment at hospital and who had been discharged or had lapsed from attendance two years previously. The total number, omitting those who had moved away and left no trace, was 78. Expressed in percentages we have the results shown in Table XII.

TABLE XII.

PERCENTAGE OF HOSPITAL GROUP.

Much improved.	*Improved.*	*No change.*	*In institutions.*
43·5	19·2	28·2	9

The hospital uses the term "much improved" when the symptom appears to have cleared up, and this group therefore corresponds to the last column of Table X. It must be noted that whereas the hospital figures are based on written records, allowance must be made for the teachers possibly forgetting some of the old problems that no longer exist. It must also be remembered that the hospital group has a relatively larger proportion of active behaviour problems which yield more readily to treatment than personality deviations. This will somewhat diminish the contrast but not sufficiently to weaken the general conclusion that there are a larger number of children attending our elementary schools who require more help than it is possible or justifiable to expect the teaching staff to give.

VIII.—CONCLUSIONS.

Our conclusions can best be expressed in terms of the questions with which the enquiry began.

(1) If we can assume that the experience of the Department of Psychological Medicine of Guy's Hospital is representative, it can be definitely stated that the problems referred for treatment are drawn unduly from the group of active behaviour disorders or habit disorders of a type disturbing to parents. Personality Deviations are not recognized for their full significance in all cases or it is not realized that psychiatric help is available for this type of case.

(2) Personality Deviations of all kinds exist to a disturbing extent in our school children. The figure yielded by the survey, 46 per cent, must be taken as a considerable underestimate since many difficulties cannot be discovered by observation at school.

(3) While teachers inevitably show considerable differences, both head teachers and assistants give astonishingly clear pictures of the character and behaviour of their boys and girls.

(4) But in spite of this clear observation, the efforts made by the teaching staff to help the children to overcome their difficulties result only in a relatively low proportion of success. This result suggests that there can be little doubt but that there is scope for psychiatric help both in interpretation and treatment so as to diminish if possible the number of our children who would otherwise be handicapped to an avoidable extent in facing the responsibilities of adult life.

APPENDIX.

QUESTIONNAIRE.

NAME ....

DATE OF BIRTH..

NAME OF SCHOOL AND DATE OF ENTRY...

....

CLASS ....

SCHOOL ATTENDANCE : (*a*) Usually regular or irregular.
(*b*) Type of irregularity.

SCHOOL WORK : (*a*) Average age of class ....
(*b*) Number in class ....
(*c*) Position in class ....
(*d*) Special abilities or disabilities, e.g., Music, Manual, etc. :
....

BEHAVIOUR : Type of problem with brief description :

....

....

....

....

When first noticed ....

How treated..

Results : (*a*) Difficulty disappeared completely.
(*b*) Difficulty disappeared partially.
(*c*) Difficulty persisted.

SOURCES OF INFORMATION : Head Teacher.
Assistant Teacher.
Care Committee.
Parent.

REMARKS : ....

....

....

Résumé.

LES DIFFICULTES DE COMPORTEMENT ET DE PERSONNALITÉ CHEZ LES ENFANTS À L'ÉCOLE.

On fit une recherche au sujet de la fréquence, dans un échantillon de la population scolaire ordinaire, des types de problème qu'on soumet au psychiâtre. L'âge des enfants était de douze à quatorze ans. Le pourcentage d'enfants montrant un type ou l'autre de désordre ("personnalité," "comportement," "habitude," ou scolaire) variait de 36% à 54% le moyen de toutes les écoles étant de 46%. Une comparaison avec les cas soumis au psychiâtre démontre que la fréquence est plus élevée chez ceuz-ci, probablement parce que de tels désordres sont plus frappants. Le pourcentage des problèmes signalés à l'école, qu'on arriva à résoudre complètement, n'était jamais plus de 8%.

Zusammenfassung.

BETRAGENS-UND PERSÖNLICHKEITSSCHWIERIGKEITEN BEI SCHULKINDERN.

Man untersuchte bei einer ausreichenden Anzahl gewöhnlicher Schulkinder das Vorkommen der Problemtypen, die einer Beratungsklinik für schwererziehbare Kinder gewiesen wurden. Das Alter der Kinder erstreckte sich vom 12. bis zum 14. Lj. Der Prozentsatz von Kindern mit irgend einer Art Störung (Persönlichkeits—Betragens—Gewohnheits—oder Schulstörung) schwankte zwischen 36% und 54% ; der Durchschnitt aller Schulen war 46%. Vergleich mit Fällen, die einer Beratungsklinik für schwererziehbare Kinder zugewiesen wurden, zeigte, dass das Vorkommen von Betragensstörungen bei diesen häufiger ist, wohl weil derartige Störungen mehr in die Augen fallen. Der Prozentsatz der in der Schule gemeldeten Probleme, die spontan geheilt wurden, war niemals über 8%.

THE PREDICTIVE VALUE OF EXAMINATIONS AND PSYCHOLOGICAL TESTS IN THE SKILLED TRADES.*

BY ERIC FARMER.

I.—*Introduction.*
II.—*The experiments.*
III.—*Discussion of results.*
IV.—*Predictive value of the interview.*
V.—*Criteria for judging value of examinations.*
VI.—*Conclusion.*
VII.—*Summary of Results.*

I.—INTRODUCTION.

BEFORE we can arrive at any conclusion as to the relative predictive value of examinations and psychological tests we must first be clear as to the criterion by which their value is to be judged. If this criterion is itself an examination then we should expect it to have a closer association with a previous examination than with a set of psychological tests. The correlation between a preliminary and final examination is not really a correlation between two different measures, but between two measures of the same type applied at different periods. In so far as the two examinations are valid measures of the same capacities we should expect a correlation similar in magnitude to that usually found between two intelligence tests.

Professor C. W. Valentine in his valuable book " The Reliability of Examinations " makes it clear that this is not always the case, but I shall not deal with this aspect of the problem and shall confine myself to certain experimental results obtained in the course of my work.

II.—THE EXPERIMENTS.

I gave psychological tests to some 1,400 apprentices who had been selected from a large group of applicants by an examination in Mathematics, Science, English, and general knowledge. Practically all the boys had had a secondary school education up to the age of sixteen and only about half of those who took the examination were successful. At the end of three years training in various skilled trades they were given a final test consisting partly of practical workmanship judged by technical assessors and partly of a scholastic examination in the same subjects as the entrance examination.

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* Read before the Psychology and Education Sections at the British Association Meeting, 1933.

The correlation between the scores in these two examinations was ·588, which is fairly high, especially when it is borne in mind that it was obtained from a selected population, since only half the candidates were successful in the entrance examination. If the coefficient had been obtained from a less selected population it is probable that the association between the entrance and final examinations would have been closer. The correlation between the entrance examination and the final practical test was only ·183*. Although this coefficient is small it is nevertheless significant and shows that the entrance examination had some predictive value for the purely practical side of the occupations.

A linguistic intelligence test was given to these subjects and the correlation between this and the practical criterion was ·152, which is not quite as high as that yielded between the entrance examination and the practical criterion. The correlation between a performance intelligence test and the practical test was ·241. When this performance test was combined with linguistic intelligence the correlation with the practical test was raised to ·261 and when it was combined with the entrance examination a coefficient of ·281 was yielded. The performance intelligence test, the linguistic intelligence test, and the entrance examination all inter-correlated significantly, which in part explains why their combination only raises the original correlation between entrance examination and the practical criterion by ·10. These three measures had a factor in common and we may regard them as a group of reasoning tests in which linguistic intelligence and the entrance examination have the lowest predictive value and the performance test the highest.

A group of sensori-motor tests which were found to have a common factor, and were called æsthetokinetic tests† yielded a correlation of ·124 with the practical criterion, which is lower than that yielded by any of the reasoning tests. The æsthetokinetic tests, however, did not inter-correlate with any of the tests in the reasoning group and so presumably measured some factor involved in the criterion, but not in the reasoning tests. When the æsthetokinetic tests were combined with the reasoning tests a correlation coefficient of ·330 was yielded which should be compared with the coefficient of ·183 yielded by the examination alone.

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* All the coefficients of correlation and contingency mentioned in this paper are more than three times their probable error and so may be regarded as statistically significant. Many of them are small but the large number of observations from which they were obtained render them statistically significant. The product moment method of correlation was used throughout.

† *A Study of Personal Qualities in Accident Proneness and Proficiency*, by E. Farmer and E. G. Chambers. Industrial Health Research Board Report, No. 55.—H.M Stationery Office, 1929.

A further group of 212 apprentices were given mechanical aptitude and ability tests. These yielded a correlation of ·360 with the practical criterion, which is appreciably higher than that of ·183 yielded by the entrance examination. When these mechanical tests were combined with any or all of the reasoning tests correlations were yielded which differed only in the third place of decimals from that yielded by the mechanical tests alone, so that nothing is gained in predictive value by doing so.

III.—DISCUSSION OF RESULTS.

The general conclusion to be drawn from the experimental results is that within these fairly large groups of skilled workers the entrance examination and the linguistic intelligence test have the lowest prognostic value as measured by the practical criterion, but by adding to them a performance intelligence test and certain sensori-motor tests a combined test is formed which has greater prognostic value than any of the constituent tests. Further that the mechanical test has greater prognostic value than the combined tests and its value is not increased by adding either the entrance examination or any of the other tests to it.

It is important to bear in mind that we are not discussing the relative value of examinations and psychological tests, but only their predictive value. Before criticizing examinations it is important to know what the exact function of an examination is. An examination tells us nothing more about those who pass it than that they have reached a certain standard in a given number of subjects. An examination presumably measures intelligence, educational facilities, and the ability to make use of them. All these things are important in any walk of life, though in some occupations they are more important than in others, and for these a more difficult examination is justified. The fact that variations in examination order above a certain level are not closely associated with variations in occupational ability is no reason for regarding examinations as useless. An examination is a valuable instrument of selection, because it eliminates those whose educational deficiencies would be a handicap in skilled occupations. If a further selection is required then we must endeavour to measure other factors involved in occupational proficiency by means of other tests. From this point of view a scholastic examination may be regarded in the same light as a medical examination, namely as a qualifying test. A high degree of medical fitness is requisite for certain occupations, but proficiency in these occupations has never been found to correlate significantly with degrees of medical fitness above a certain level. We may argue about the best type of examination or the right standard, but in society as it is now constituted there is no doubt that skilled occupations demand a certain standard of educational ability, and that the best way of ensuring this is by appropriate examinations.

IV.—PREDICTIVE VALUE OF THE INTERVIEW.

The practical man sometimes adopts a somewhat condescending attitude towards examinations and psychological tests. He is willing to use the information supplied by these two measures, but makes his own judgment the determining factor in selecting candidates. It is not often possible to test the validity of this method of selection, but I have been able to do so in one case. Psychological tests and a scholastic examination were given to 284 subjects destined for a semi-skilled mechanical occupation. They were graded on entry according to their presumed ability to profit by the training they were to receive and were graded at the end of this training according to the degree of proficiency they had attained judged by technical experts examining their work. The contingency coefficient between their initial grading by the psychological tests and their final grading for proficiency was ·425, by the examination ·365 and by those responsible for training making use of both the examination and psychological tests, was only ·211. In this particular case, therefore, better predictive results would have been obtained if those in authority had relied solely on the psychological tests or the examination without troubling to interview each candidate, and use their own judgment as to his ability.

I do not wish to discredit the interview as a method of selection, for I regard it as a very important one. In some occupations it is the only one feasible and I think it is at present the only satisfactory way of assessing temperamental factors. It does not, however, follow that everyone who interviews is able to do this; moreover, temperament is not so important in some occupations as in others. The particular one in which these men were engaged was of an entirely mechanical nature, so that it is not surprising that the psychological tests which were designed to measure mechanical ability and an examination that measures intelligence which has been shown to be involved in capacity for mechanical work, gave better results than the judgments of the practical men who carried out the interview. Whatever else one can assess in an interview I do not think one can assess mechanical ability, nor intelligence so accurately as by means of tests.*

It will be noted that the examination had a higher predictive value in this semi-skilled occupation than with the skilled apprentices. This is true also of the linguistic intelligence test. These subjects were an unselected group with a low standard of intelligence and when such people are employed in a semi-skilled occupation there is always a higher correlation between intelligence and occupational proficiency than in the case of a selected group with high intelligence engaged in a skilled occupation. All my experimental results are consistent with the hypothesis that the lower the mean intelligence of a group the closer will be the association between variations in intelligence or examinational order, with proficiency in an occupation demanding intelligence. This is not true of the unskilled trades. I have never found any association in repetitive trades between intelligence and occupational proficiency, and I am inclined to think that the same would hold of examination order, although I have never been able to measure it.

Proficiency in unskilled trades depends on sensori-motor capacity, proper incentive and appropriate temperament.

V.—CRITERIA FOR JUDGING VALUE OF EXAMINATIONS.

It may be said of examinations that they have high predictive value because those chosen by them on the whole do well in skilled occupations. This is true: only 7 per cent of the 1,400 apprentices I referred to in the beginning of my paper failed in their final test, and since they were chosen by examination this may be taken as evidence of the predictive value of the examination in spite of the low correlation between examination scores and final proficiency. This, however, is not a valid criterion. A given number of apprentices were required for the occupations and a sufficient number were originally selected so as to provide the number finally required and allow for a few failures. If these apprentices had been selected by the psychological tests I do not think there would have been fewer failures, for the bottom boys in the final test, whatever their standard, would always be rejected. All that would have happened if the psychological tests had been used would be to raise the general level of performance, not to lessen the number of failures. Failure in an occupation depends upon the general level of performance of those engaged in it and cannot be taken as an adequate criterion for measuring the predictive value of methods of selection. These must be compared with some measure of occupational performance if it is possible to get one. In a large number of occupations no valid measure of performance is available, and in these we cannot assess the relative predictive value of psychological tests and examinations. Often we are only able to compare performance in an entrance examination with performance in a final examination, but this is not a valid criterion of the predictive value of the preliminary examination, but merely a comparison of performance in two examinations. In order that a final examination may be regarded as an adequate measure of the predictive value of an entrance examination for occupational performance we must go on to inquire how far the final examination is itself a criterion of occupational proficiency.

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* Magson, E. H., *How we judge Intelligence.—Brit. Journ. Psy. Monograph* IX. Valentine, C. W., *The Relative Reliability of Men and Women in Intuitive Judgements of Character.—Brit. Journ. Psy.*, XIX, Part 3, January, 1929.

The after career of these 1,400 apprentices has been followed and their occupational proficiency measured by the time it took each individual to reach certain specified standards over a period of seven years, compared with their proficiency as measured at the end of their training period. The coefficient of contingency between these two measures is ·529. This is sufficiently high to show that the practical test at the end of training was a valid one for judging the predictive value of the entrance examination and the psychological tests.

VI.—CONCLUSION.

Finally, I should like to raise the question whether it is the function of examinations to be predictive in any other sense than as qualifying tests. The subjects in the examination taken by these apprentices were mathematics, science, English and general knowledge. Mathematics yielded a correlation of ·177 and science one of ·272 with the practical criterion, but there was no significant correlation between general knowledge or English and the criterion. In order to give this examination its greatest predictive value emphasis would have to be placed on the mathematical and scientific side to the exclusion of the humanities, but it is doubtful if extreme concentration in school on those subjects which have predictive value for special occupations would be an advance in education. With the increase in specialization and leisure, which are such marked characteristics of the present tendencies in industry, it may be wiser for primary and secondary education to develop non-vocational rather than vocational subjects. For the great mass of the population it is the only time in which they have much opportunity for non-vocational education, and with the increase in leisure which modern industrial methods are making possible, education in a wider field than specifically vocational subjects may come to play a more important part in social organization than it does even at the present time.

The standard that can be reached in vocational subjects during the school period is so elementary that further vocational education in the after school period is always necessary, and this would be so however much attention were paid to vocational subjects at school. Taking these various considerations into account I would suggest that examinations will fill a more useful function if they are designed to guarantee a certain level of general education and not to be predictive of vocational fitness for specific occupations.

My experimental results have all been drawn from the engineering and semi-skilled mechanical trades. These form only a part—though an important one—of the total number of occupations, entrance to which is in many cases by examination. In the case of the engineering trades there is some evidence in favour of supplementing the usual methods of selection through examinations by the addition of appropriate psychological tests of known reliability. Before any drastic changes are made it would be wise to subject these psychological tests to further research, and an interesting sphere for carrying out this research would be in the selection of elementary school boys for secondary technical education. With regard to the unskilled trades selection has never been by examination, so that the choice lies between selecting by the usual rather casual methods or by psychological methods. In certain cases, involving small groups of workers, psychological tests have been shown to have predictive value for occupational proficiency in unskilled trades, but more research is necessary before full reliance can be placed on these methods.

In the case of those occupations that are entered by examination, but in which occupational proficiency has not been compared with performance in psychological tests, we must hold an open mind as to the relative predictive value of examinations and psychological tests until reliable experimental results are forthcoming.

VII.—SUMMARY OF RESULTS.

(1) In a group of 1,400 skilled apprentices the correlation between the entrance examination by which they were selected and the final practical test of proficiency was ·183. When the entrance examination was supplemented by the addition of certain intelligence and sensori-motor tests this correlation was raised to ·330.

(2) In a group of 212 skilled apprentices tests for mechanical ability and aptitude yielded a correlation of ·360 with the final practical test for occupational proficiency. This correlation was not increased by the addition of intelligence tests or the examination.

(3) In a group of 284 semi-skilled workers it was possible to compare their initial ratings by (*a*) psychological tests, (*b*) examination, (*c*) interview, with their final rating for practical ability. The contingency co-efficients yielded were ·425 for the psychological tests, ·365 for the examination and ·211 for the interview.

(4) The after careers of 1,400 apprentices were followed over a period of seven years. The contingency co-efficient between their rating at the end of their training period and that obtained during their post apprenticeship period was ·529.

RÉSUMÉ.

LA VALEUR PRONOSTIQUE DES EXAMENS ET DES "TESTS" POUR LES MÉTIERS SPÉCIALISÉS.

Dans tous les groupes industriels, où il fut possible de comparer la valeur relative des examens et des "tests" pour prédire la capacité professionnelle, les "tests" ont fourni de meilleurs résultats. Ceci n'est point en lui-même un argument contre les examens, qui sont indispensables pour vérifier l'aptitude scolaire, mais c'en est un contre leur emploi comme critère de recrutement.

On suggère qu'on devrait les employer comme épreuves d'aptitude générale, et qu'on devrait faire parmi les candidats montrant cette aptitude, un second choix au moyen de "tests." Dans beaucoup de métiers, y compris quelques-uns de la plus grande importance, ceci est impossible car il n'existe point de "tests" ayant une valeur pronostique établie pour ces métiers. Même dans les métiers mécaniques, où l'on a pu établir que certains "tests" possèdent une valeur pronostique, il reste bien des recherches à faire avant qu'on puisse introduire dans l'administration des changements importants.

L'embauchage pour les métiers non-spécialisés ne s'est jamais fait par examen, de sorte qu'il existe seulement le choix entre l'embauchage par "tests" et les méthodes actuelles plutôt tâtonnantes. Jusqu' à présent il n'y a pas assez d'évidence pour arriver à quelque conclusion générale quant à la valeur des tests psychologiques pour l'embauchage dans ces métiers, bien qu'il existe quelque évidence que des tests analogues sont utiles dans certains cas.

ZUSAMMENFASSUNG.

DER VORHERSAGENDE WERT VON PRÜFUNGEN UND PSYCHOLOGISCHEN TESTS BEI DEN GELERNTEN BERUFEN.

In allen industriellen Gruppen, in denen es möglich war, den verhältnismässigen vorhersagenden Wert von Prüfungen und psychologischen Tests für die Berufsfähigkeit zu vergleichen, ergaben die psychologischen Tests bessere Resultate. An

und für sich ist dies kein Argument gegen Prüfungen, die nötig sind, um geistige Fähigkeiten zu prüfen : aber es verurteilt sie als Mittel der Auslese. Es wird vorgeschlagen, sie als Befähigungstests zu benutzen und eine weitere Auslese derjenigen, die die nötige Schulbildung hinter sich haben, mittels psychologischer Tests vorzunehmen. In vielen Berufen-unter ihnen sind einige der wichtigsten-ist dies unmöglich, denn es gibt keine psychologischen Tests, die sich als tauglich gezeigt haben, vorhersagenden Wert für diese Berufe zu haben. Sogar bei den mechanischen Gewerben, bei denen man gezeigt hat, dass gewisse Tests vorhersagenden Wert haben, ist noch viel Raum für Nachforschungen, ehe es ratsam wäre, einschneidende Änderungen in der Verwaltung vorzunehmen.

Zutritt zu den gelernten Berufen erfolgte nie mittels einer Prüfung ; man hat also die Wahl zwischen Zutritt mittels psychologischer Tests oder den gegenwärtigen ziemlich planlosen Methoden. Zur Zeit gibt es zu wenig Beweise, um zu einem allgemeinen Schluss über den Wert psychologischer Tests für die Auslese in diesen Gewerben zu kommen, obgleich es schon Beweise gibt, dass entsprechende Tests in gewissen Fällen nützlich sind.

A QUANTITATIVE STUDY OF EIDETIC IMAGERY.

BY H. TEASDALE
(*From the Department of Education, University of Leeds*).

- I.—*Previous work on eidetic imagery.*
- II.—*The aim of the present investigation.*
- III.—*The tests described.*
- IV.—*The marking of the tests.*
- V.—*The results.*
- VI.—*Summary of conclusions.*
- VII.—*Bibliography.*

I.—PREVIOUS WORK ON EIDETIC IMAGERY.

IN reviewing previous investigations on eidetic imagery certain points are conspicuous. In the first place, much of the work has been confined to a study of isolated cases—cases in which abnormally good eidetic ability is observed. Such work has resulted in claims being made for the importance of the phenomenon, without sufficient statistical evidence to support them. What statistical work has been done does not seem to be very reliable; no mention is made of tests of reliability. Different investigators use different criteria for determining the strength of the eidetic disposition. Roessler[18] relies solely on the criterion of richness of detail. Zeman[22] stresses the obtaining of voluntary images and original colours. Others accept the results of tests which reveal the presence of abnormal A.I.'s (after-images) and M.I.'s (memory images)—that is, they accept the conception of latent eidetic ability. Further, among those who use the same criteria there does not appear to be a standard method of marking. Finally, different investigators use varying experimental conditions. Thus Jaensch[5] exposed his stimulus pictures for 15 seconds, Allport[1] for 35 seconds, and Kluver[8] used 30 seconds and 60 seconds for two silhouette pictures and 15 seconds for pictures of animals. No reason is given for the choice of these varying times of exposure. Of course, complex pictures will require longer exposure times than simpler ones, but it is surprising that Allport and Kluver should use the same times of exposure for E.I.'s (eidetic images) as Jaensch uses for A.I.s.

Not only is the experimental method open to criticism but the results obtained vary widely with different investigators, and in certain cases are entirely contradictory. Jaensch's theory of perceptual development and the claims he makes for the educational significance of eidetic imagery rest largely on the supposition that eidetic ability is strongest in young children and that it decreases with increasing age. But he has only Roessler's[18] results in support. Bonte,[2] Lieffman,[16] Allport,[1] Fischer,[3] and Hirschberg all disagree, most of them maintaining that the peak of eidetic phenomena lies at the age just before puberty. This discrepancy would seem to be a further indication that some of the work performed is unreliable. What is needed now is reliable, statistical evidence of the manner in which eidetic phenomena vary with age.

II.—THE AIM OF THE PRESENT INVESTIGATION.

The aim in this investigation has been, primarily, to enquire into the variation of the prevalence and strength of eidetic imagery among school children between the ages of 10 and 14 years, by means of individual tests on subjects chosen at random. Younger children were not tested because of the difficulty of obtaining reliable introspection in such cases. Moreover, the ages 10-14 years are those concerned in the dispute regarding the variation of eidetic phenomena with age.

The first important requirement was to devise a reliable test which would enable the investigator to discover subjects with strong eidetic ability and to classify them according to that ability. This, of course, involved the framing of a suitable system of marking.

Jaensch[5] states that a statistical survey should include both manifest and latent cases. But Bonte[2] considers that the criterion of latent eidetic ability has not yet been elaborated and many reject the idea of latent eidetic ability altogether. With those who do recognize its existence there is, undoubtedly, confusion as to what the criteria should really be. For these reasons latent eidetic ability has been ignored in the scheme of marking adopted in this investigation. Tests were included which revealed abnormally good A.I.s, but they were only included incidentally and did not form part of the main test, which aimed at discovering the prevalence of manifest ability only. The aim of this enquiry has been to obtain a statistical account of the prevalence of eidetic images, not of the prevalence of the eidetic disposition.

III.—THE TESTS DESCRIBED.

The experiments performed consisted of six independent tests. The experimental conditions which remained constant throughout the investigation were those used by either Jaensch or Kluver.[8] Thus, throughout the tests a homogeneous dark grey background was used according to Jaensch's specifications.* This background was used in a vertical position. The stimulus picture was held in position in the centre of the background and was removed when required by means of a cotton thread attached to the back of the picture. A stop-watch was used to determine the exposure time and the duration of the image. The background was illuminated by daylight, which, although not so constant as artificial light, is superior for lighting purposes. Tests were never performed when the daylight was unsatisfactory, and sunlight was never allowed to fall on the background.

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* *Eidetic Imagery*, by E. R. Jaensch, p. 5.

No head-rest was used. It was arranged that the subject should be about two feet away from the background, but he was allowed a certain amount of freedom. Within certain limits he could vary this distance. It was thought that less error would be introduced by giving this freedom than if a head-rest were used—its presence might have been very disturbing to children.

In the first test a red square, with a side of 2-ins., was presented for fixation for 10 seconds. The aim of this test was to demonstrate to the child what was meant by " seeing " something on the grey background.

After an interval of two or three minutes the same square was again presented for fixation, this time for 20 seconds. The motive was to discover subjects with abnormally long continuous A.I.s. This test was only a subsidiary one, its motive being to discover what justification there was for Jaensch's claim that such A.I.s are a sign of eidetic ability.

The third test consisted of the fixation of a silhouette picture—one of the series which Jaensch himself used. (The series is entitled : " Was alles am Morgen geschieht," and is published by Braun und Schneider, Munich.) The subject was asked to fixate a central feature of the picture. After the exposure time of 15 seconds, the subject, previously instructed, looked at the grey background and described every detail occurring in the image. He usually described the images without questioning, owing to the instructions previously given For example, in the third test the following words were repeated to each child before showing the picture :

> " This time I am going to put this picture (the subject is shown the picture for a few seconds) on the grey paper, and while it is down there I want you to fix your eyes on the lady's hand (a central detail). Never mind about the rest of the picture—just look at the lady's hand. Then, when I take the picture away just do as you did before—keep your eyes on the grey paper and tell me exactly what you can see. Whatever you do, don't look up.'

In certain cases questions were necessary, such as " [illegible]n you see anything? " or, " Are you sure there is nothing at all. [illegible] subject said he could see a man or woman he would be asked how big he or she was. The usual answer was " As big as he (or she) was in the picture." The subject would then be asked what colour the man was or if he could see the man distinctly. He might be asked to tell exactly what he could see about the man. Often the man's hat would be described or the subject would mention other details. In such cases care was taken to ensure that the subject was not referring to the picture but to a visual image, by such a question as " Do you mean that you can remember that the man's hat was like that or can you see his hat, now, on the grey paper? "

Most good eidetic subjects, however, needed no prompting or very little. They usually commenced to give a list of the chief features of their images and then continued with a list of details. All the details occurring in the actual picture had been previously printed on a blank form so as to enable the experimenter to record those seen in the image by marking the appropriate words. A quick method of recording the results is very necessary as in some cases the duration of the image is not more than a few seconds.

These three preliminary tests were all used by Jaensch, whose times of exposure were those adopted here. They serve a very useful purpose in that they put the subject in the correct attitude by the time the three principal tests are given. Moreover, the " after-image " of the picture shows him what to expect with the other pictures. This attitude of expectancy seems to favour the obtaining of E.I.s.

Results obtained from the *fixation* of squares and pictures in the above tests were not taken into account in the marking. Marks were only given where an image was obtained when the subject had only *looked at* the stimulus picture. Any images obtained without fixation of the stimulus being necessary were termed E.I.s.

Non-fixation of the stimulus was employed in the fourth, fifth, and sixth tests. In these tests the subject was marked and graded according to his eidetic ability. In each test a picture belonging to the above series was exposed for 20 seconds for non-fixating inspection. Several minutes were allowed to elapse between each test, and after removal of the stimulus picture, 60 seconds were allowed for the E.I. to develop before it was concluded that no image would be obtained. The choice of 20 seconds as the most suitable time of exposure was the result of some previous tests carried out with varying times of exposure.

The subjects were instructed that they must not look up from the background until told to do so. On removal of the stimulus the experimenter asked if anything could be seen and then waited for spontaneous answers. In many cases he could only ascertain what was seen by further questioning. Leading questions were avoided wherever possible, but where the subject was particularly taciturn such questions were necessary. Various methods were adopted to minimize the effect of suggestibility. The subject was frequently reminded that the experimenter desired to know what was "seen," not what was "remembered." The child was frequently asked to point out exactly where the image appeared. Cross-questioning also served to check any effect of exaggeration. The general attitude of the subjects, however, convinced the writer that suggestibility was not a serious handicap. A definite tension of the eyes was observed when an image appeared. Moreover, most subjects described their experiences in a manner so confident as to render it evident that they had obtained E.I.s.

The above tests were all carried out in two Leeds elementary schools. At the first school (*a*) preliminary tests were performed in order to allow the experimenter to become acquainted with the nature of the problem and to enable him to develop the experimental technique. Results of these tests are not given, but results are given of tests on forty-five boys in Standard V at this school; in fact, two series of results are given, results obtained on different days with different sets of pictures. These two series of tests were carried out with a view to determining the reliability of the test. Having found the method to be reliable all boys in Standards IV, V, VI, VII, and VIII at the second school (*b*) were tested—173 boys in all. The conclusions at which the writer has arrived are based on these results only, because these 173 subjects were tested under constant conditions, the same room being used throughout.

IV.—THE MARKING OF THE TEST.

In devising the scheme of marking the first point to be decided was the criteria that should be used to indicate whether a person possessed eidetic ability or not, and in the case of an eidetic subject, to indicate the extent of that subject's ability. There were several factors which needed consideration—intensity, clarity, duration, and richness of detail. Children certainly cannot express their experiences of the clarity and intensity of their images with sufficient accuracy to enable the experimenter to allocate marks, but with duration and richness of detail, accurate judgments can be made. The former is determined simply by the subject stating when the image appears and disappears, while judgments of richness of detail are merely judgments of absence and presence.

Moreover, persistence and rich detail are recognized as being characteristic features of eidetic imagery. It was also found in the present investigation that there was a high correlation between duration and richness of detail. The 173 children tested at school (*b*) were marked provisionally on the basis of " amount of detail seen ; " then according to these marks they were placed in one of three groups. The table below indicates the high correlation between the two criteria—richness of detail and duration.

	No detail seen.	*Poor detail seen.*	*Rich detail seen.*
Number of subjects with E.I.'s lasting less than ten seconds	92	38	4
Number with E.I.'s lasting between ten seconds and one minute	0	10	10
Number with E.I.'s lasting for over one minute	0	0	19

It is agreed that long duration is characteristic of E.I.s. The table shows there is a high correlation between this factor and that of richness of detail. Roessler considers that richness of detail should be the criterion. Intensity and clarity certainly cannot be used. It seems to be admitted by all investigators that the colour of the image is no criterion. How, then, should the marking be " weighted " so that each of the factors, duration and richness of detail, receives its due consideration ?

The exact scheme of marking cannot be devised from considerations of the validity of the test as there is no external criterion which can be used. There is a similar difficulty in using the method which depends upon reliability considerations, since the distribution of marks does not allow use to be made of coefficients of correlation.

An arbitrary system of marking was therefore adopted, which takes into account duration and richness of detail, both of which are distinguishing features of the E.I. (That the scheme is reliable is shown below, the method of demonstrating the reliability avoiding the use of coefficients of correlation.)

The scheme of marking adopted was as follows : In the test three pictures were shown (one at a time) for non-fixating inspection. The maximum number of marks that could be obtained on one picture was twenty-four. Of these, eighteen were given for the amount of detail seen, and six for the duration of the image. The six marks for duration were awarded according to the following scheme :

Duration.	*Marks.*
At least 10 seconds	1
At least 30 seconds	2
At least 1 minute	3
At least 2 minutes	4
At least 5 minutes	5
At least 10 minutes	6

The eighteen marks given for detail were awarded as follows:

For an image portraying the silhouette in full detail—twelve marks.

For a full reproduction of the background of the picture—six marks.

In all the pictures used the chief features were in black silhouette with the background in delicate colours. In one of the pictures, for example, the silhouette consisted of two men and a coach drawn by a pair of horses, and the background consisted of an archway and a house with doors and windows. For seeing the silhouette as a whole six marks were awarded. The other six marks were given for details seen in the silhouette, such as the horses, the wheels, the woman in the coach, her hand, the driver, his horn, a broom in the hand of one of the men in the street, and so on. The experimenter used his judgment in allotting marks—one mark was not always given for each detail seen. As regards the detail in the background of the picture, one mark was usually given for each detail seen in the image, with a maximum of six marks. The reason that more stress was laid on the silhouette than on the other parts of the picture was that, with the majority of subjects, the silhouette was the only part of the stimulus giving rise to images.

The maximum number of marks that could be scored was seventy-two, twenty-four with each picture. In order to obtain the full twenty-four marks the subject had to obtain an image which reproduced the picture with photographic accuracy and which lasted for at least ten minutes. Actually, the boy who received the largest number of marks obtained forty-nine on the three pictures.

Each subject having been given marks as above was then placed in one of four groups according to the following scheme:

Group I.	*Group II.*	*Group III.*	*Group IV.*
Over 24 marks.	13-24 marks.	1-12 marks.	No marks.
Exceptionally good E.I.'s.	Good E.I.'s.	Poor E.I.'s.	No E.I.'s.

Many subjects, after regarding a stimulus picture with non-fixation, obtained an image which contained almost the whole of the detail, in complementary colours and with perfect clarity, for a mere instant. Images seen in this manner do not appear to be E.I.s but A.I.s. Subjects obtaining such images, therefore, were placed in Group IV. There were other subjects whose images were not distinct, being more " blots " or "blurs." In many cases the image was so shapeless as to make it impossible for the subjects concerned to recognize it as an image of the original picture. Previous systems of classification have taken such images into account. It is, however, a recognized fact that one of the predominating features of E.I.s is the richness of detail; this seems to justify the ignoring of meaningless or shapeless figures. For this reason subjects who could only obtain " blots " for images were also placed in Group IV.

Thus Group IV contained those who obtained no images whatsoever, those who obtained images for a mere instant only, and those who obtained shapeless images. Group III contained subjects who could obtain only poor images—images which did not differ considerably from A.I.s. Subjects in Groups I and II obtained images which were undoubtedly eidetic images.

It has been mentioned that the validity of the test cannot be expressed by means of a coefficient of correlation because of the absence of any external criterion, but it can be seen from general considerations that the test is a valid one. In the first place, the test and system of marking used are based on the generally accepted properties of the E.I. Secondly, the stimulus pictures used are the ones advocated by Jaensch. Thirdly, the method of estimating the ability of the subjects by grading them as shown is really only an improvement on the methods previously used. These previous systems of grading subjects take into account latent eidetic ability and make use of criteria such as Emmert's law. Neither latent eidetic ability nor Emmert's law is generally accepted. They are never brought into use unless the subject fails to get manifest E.I.s. But the present investigation aims at studying manifest ability only, and so the use of doubtful criteria is avoided. This, together with the above facts, certainly indicates that the test does measure the ability to obtain E.I.s.

That the test is a reliable one can be seen from experiments carried out with one class of boys on two separate days with two different selections of stimulus pictures taken from the same series. It was impossible to express the high correlation between the two sets of results in the form of a coefficient or correlation because of the uneven distribution of the scores. Thus on the first set, thirty-one boys out of forty-six failed to score any marks whatsoever. But from the table shown below the high correlation between the two tests is apparent.

RELIABILITY OF THE TEST USED.

Subject.	*Marks in First Test.*	*Marks in Second Test.*
A	27	16
B	26	18
C	25	16
D	22	18
E	17	19
F	11	16
G	11	11
H	10	7
I	9	4
J	8	2
K	5	4
L	2	6
M	4	2
N	14	0
O	2	0
P	0	8
Q	0	8

Twenty-two boys had no marks in either test.

We see from the above table that thirteen boys obtained marks on both tests ; twenty-nine boys obtained no marks whatsoever on both tests ; four boys scored marks on one test only. Further, of the thirteen boys who scored marks on both tests, those who scored the highest marks on one test usually got the highest marks in the other. It has already been stated that those subjects with over twelve marks get images which are undoubtedly E.I.s, whereas the images of those with 1-12 marks are much weaker—rather like A.I.s. If we divide the thirteen eidetic subjects into two sub-groups, as shown below, then only one boy will not be in the same sub-group in both tests.

Good E.I.'s.				*Weak E.I.'s.*			
Over 12 *marks.*				1-12 *marks.*			
First Test.		*Second Test.*		*First Test.*		*Second Test.*	
Subject.	*Marks.*	*Subject.*	*Marks.*	*Subject.*	*Marks.*	*Subject.*	*Marks.*
A.	27	A.	16	G.	11	G.	11
B.	26	B.	18	H.	10	H.	7
C.	25	C.	16	I.	9	I.	4
D.	22	D.	18	J.	8	J.	2
E.	17	E.	19	K.	5	K.	4
—	—	—	—	L.	2	L.	6
—	—	—	—	M.	4	M.	2
—	—	F.	16	F.	11	—	—

Slightly better results seem to have been obtained with the first series of pictures, but that is probably due to the fact that they were more suitable for the purpose. It is evident, however, that the method of marking the tests is reliable.

V.—THE RESULTS.

The distribution of scores in the five classes tested at School (*b*) are shown below :

Class	VIII.	VII.	VI.	V.	IV.	Total.
Number of subjects tested	24	36	45	34	34	173
Group I : Over 24 marks....	0	2	2	3	4	11
Group II : 13-24 marks	2	3	7	6	1	19
Group III : 1-12 marks	6	14	7	3	4	34
Group IV : No marks	16	17	24	22	25	109

The results show that the majority of the boys obtain no marks at all. In fact, only sixty-four of the 173 subjects obtained images when non-fixation was employed. That is, only 37 per cent of children between the ages of 10 and 14 can obtain images of any description with non-fixation, and whether all these are eidetic images is doubtful. The images of Group III are certainly very weak.

Now the features which differentiate boys in one school class from those in another are due chiefly to the difference in the average age of the boys in the two classes. Of the 173 subjects tested at the above school, 168 were boys of ages ranging from 10 years 0 months to 13 years 11 months, inclusive. The results with these 168 boys have, therefore, been arranged in four age-groups as shown below. The first age-group, 10-11 years, includes all those who were over 10 years and less than 11 years reckoned to the nearest month.

The following table is arranged differently from the preceding one. Because of the difficulty of deciding upon some standard above which all subjects can be considered manifest eidetics, three separate standards have been chosen. Firstly, there is the high standard which is reached by those subjects in Group I. Thus in the first row (A) of the table are the numbers of subjects with over twenty-four marks. Row (B) gives the numbers of subjects with over twelve marks. Similarly row (C) does not give the numbers of subjects in Group III but those in Groups I, II, and III. Thus the three rows indicate the numbers of subjects, in the various age-groups, who would be considered to possess E.I.s if the three separate standards were used in turn as criteria of the presence of manifest eidetic ability.

The next three rows (a), (b), and (c) show the percentages of subjects who would be called eidetics, using the three separate standards. Thus, from this table we see that, if the criterion of eidetic ability is the obtaining of over twenty-four marks, then only 5.8 per cent of boys between the ages of twelve and thirteen are eidetics. If the standard is lower, that is, if the criterion is the obtaining of over twelve marks, then 21 per cent of these boys are eidetics.

TABLE SHOWING VARIATION OF FREQUENCY WITH AGE.

Age	10-11.	11-12.	12-13.	13-14.	Total.
Number of subjects tested	32	36	52	48	168
(A) Group I: Over 24 marks	4	3	3	1	11
(B) Groups I and II: Over 12 marks	4	10	11	5	30
(C) Groups I, II, and III: Over 0 marks	9	11	20	22	62
(a) Group I	12·5%	8·3%	5·8%	2·1%	6·5%
(b) Groups I and II	12·5%	27·8%	21·1%	10·4%	17·8%
(c) Groups I, II, and III	28·1%	30·5%	38·4%	45·8%	36·9%

The numbers given in (C) include those in (A) and (B), and those in (B) include those in (A).

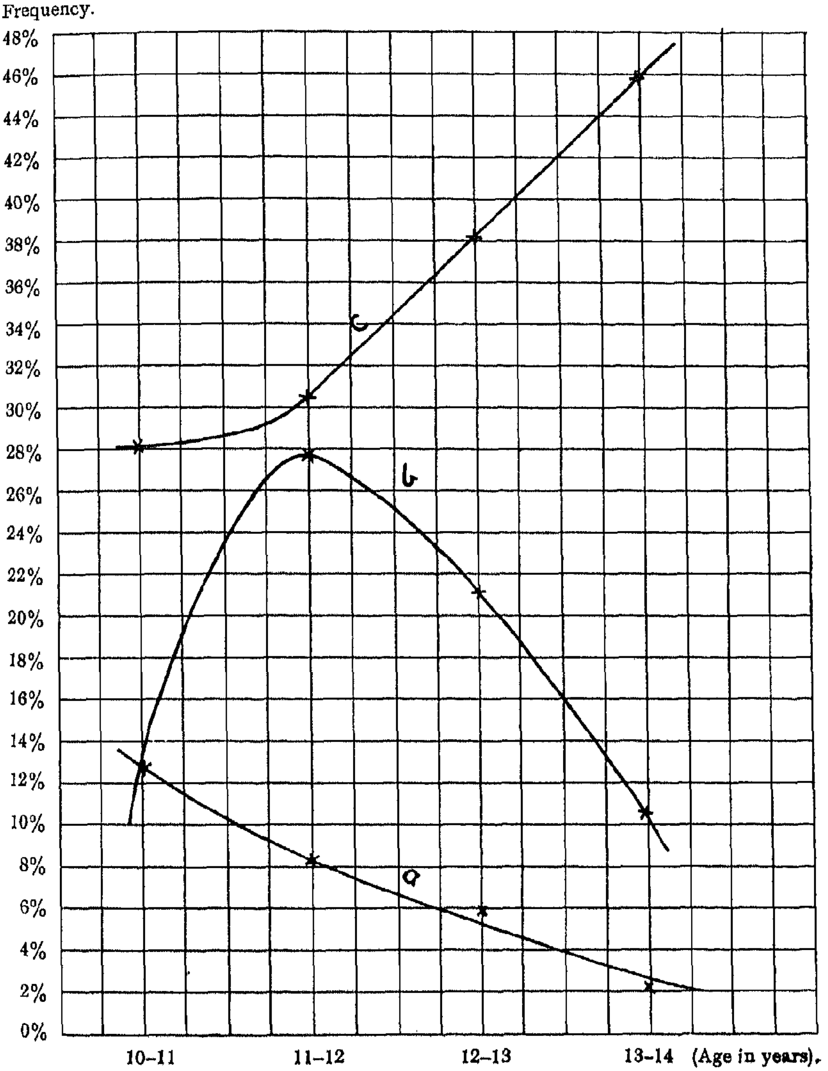
From the statistics shown in rows (a), (b), and (c) three curves (a), (b), and (c) have been drawn. These curves have a special significance. Curve (a) shows that if we consider only those subjects with exceptionally good E.I.s then the prevalence of eidetic ability decreases with increase in age. If we consider those subjects who received over twelve marks, we get curve (b) which rises to a maximum at the age of 11-12 years. Finally, if we take all subjects who get images no matter how weak, we get curve (c), which shows that the frequency increases with age. (See Fig. I.).

Now Jaensch claims that eidetic ability is most frequent at the youngest ages tested. The present investigation shows that this is so,

Fig. 1.

THE VARIATION OF EIDETIC IMAGERY WITH AGE.

Curve (*a*) includes only strong cases (over 24 marks).
Curve (*b*) includes weaker cases (over 12 marks).
Curve (*c*) includes very weak cases (over 0 marks).



so long as images are only considered to be E.I.s. when they are very rich in detail and of several minutes' duration. Curve (a) is drawn on the supposition that eidetic ability is present only when a subject gets more than twenty-four marks ; and this curve supports Jaensch's claim that the frequency of eidetic ability decreases with increasing age. Roessler's results could also be represented by a similar curve but his percentages were much higher than those obtained here. However, he tested children down to the age of six years and so this might explain his frequency of 40 per cent.

Other investigators find that the frequency is a maximum at about twelve years. Among those who obtain such a result are Allport, Bonte, Zeman, Liefmann, Fischer, and Hirschberg. But this is just the result demonstrated by curve (b), which regards as E.I.s all images giving more than twelve marks.

Thus we see that the inconsistent results previously obtained by different investigators may be due to the use of different standards. If only exceptional images are regarded as E.I.s then results in agreement with those of Jaensch will be obtained ; if the standard is not quite so high, so that more subjects are included as eidetics, then curve (b) will be obtained, which agrees with the results of the other investigators ; if very poor images are also counted as E.I.s then curve (c) will be obtained—and here there is an increase of eidetic ability with increasing age, over the range of 10-14 years, perhaps due to greater capacity for detecting and reporting very faint images.

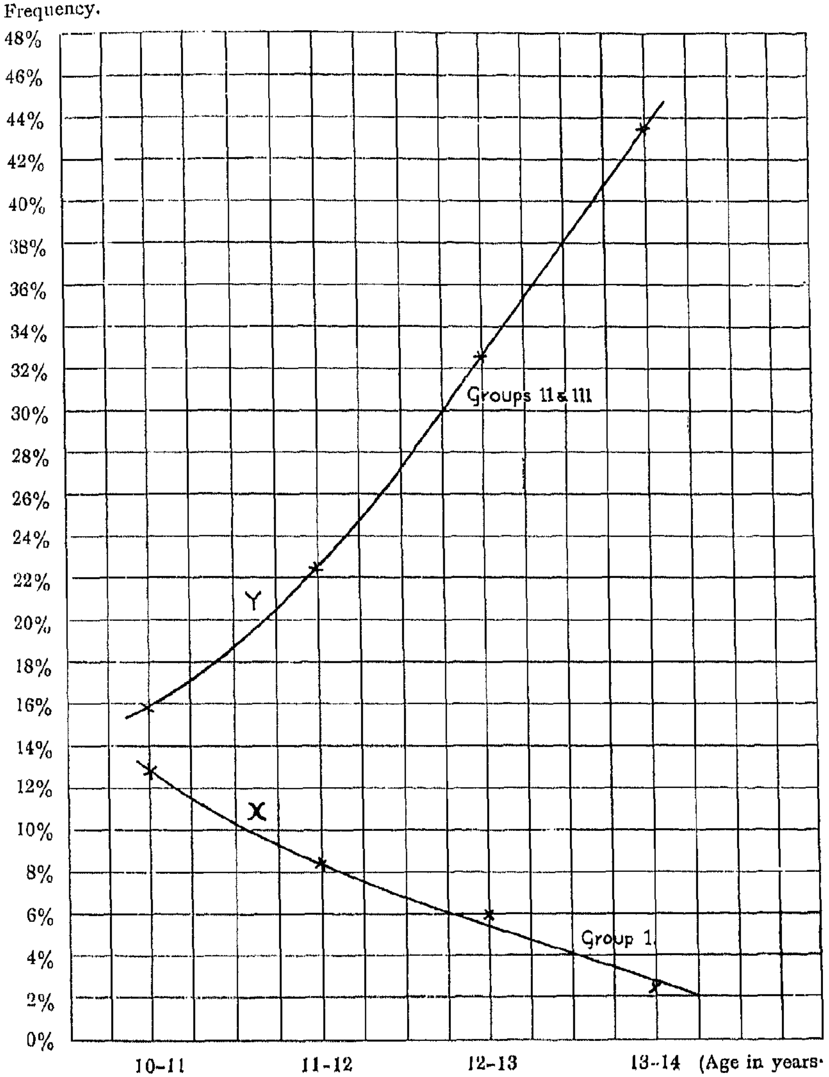
A consideration of the individual marks confirms the indications of the curves. Two subjects with forty-nine and forty-five marks respectively scored more than any others, and both these boys were less than eleven years old—that is, they were both in the youngest age group. From this point of view the results obtained are in harmony with those of Jaensch and Roessler. They contend that where E.I.s do exist among young children a very large proportion of them are of the best variety. In other words, the eidetic disposition is not only more prevalent but is stronger in the case of young than older children. It will be seen that with boys of 10-11 years, nine obtained E.I.s, four of which were in Group I—that is, of the best variety. But with boys of 13-14 years, twenty-two obtained E.I.s, of which only one was in Group I. Thus in row (c) of the above table the numbers who obtained images increased with increasing age. Of these, the numbers with exceptionally good images are shown in row (A), and these decrease with increasing age.

Thus it appears that eidetic imagery *is* stronger with younger than with older children. Whether or not the " prevalence " behaves in this

Fig. 2.

VARIATION OF FREQUENCY WITH AGE.

Curve (*X*) refers to the rich type of image (over 24 marks).
Curve (*Y*) refers to the weak type of image (0-24 marks).



manner depends, as we have seen, upon what the investigator decides shall be the criterion of an E.I.

Let us now consider those subjects (a) with over 24 marks and (b) with 1-24 marks. In the former case are those in Group I—in the latter those in Groups II and III. The following table shows the distribution of eidetic subjects within these groups.

Age	10-11.	11-12.	12-13.	13-14.
Numbers tested	32	36	52	48
(X) Groups I	4	3	3	1
(Y) Groups II and III	5	8	17	21
(x) Group I	12·5%	8·3%	5·8%	2·1%
(y) Groups II and III	15·6%	22·2%	32·7%	43·7%

The curves (X) and (Y) shown in Fig. 2 are drawn on the basis of the percentages given in rows (x) and (y).

It would appear from these curves that there are two sources of E.I.s. One gives exceptionally good images in very young children and tends to disappear with increasing age. The other produces images of a weaker type at about ten years or even less. The E.I.s become more prevalent with increasing years. After puberty, or, perhaps, during puberty, both types of image seem to disappear, although there is a tendency for the poorer type to continue.

These results have a particular significance in view of Jaensch's theory of types. Do the two types obtained in the present investigation correspond to the two types of image referred to by Jaensch?[5] If so, his theory gains considerable support from the results obtained here. But Jaensch classifies E.I.s not only on the basis of duration and richness of detail; he considers that the behaviour of the images in the two cases is entirely different, one type behaving similar to A.I.s and the other to M.I.s, one tending to appear in complementary, the other in original colours, and one appearing to be an involuntary phenomenon, the other voluntary. But in the present investigation the E.I. was never observed to behave as an M.I., excepting two cases the E.I. was obtained always in complementary or grey colours, and the phenomenon was never observed to behave as though it were a voluntary phenomenon. (Probably some of these characteristics are due to the fact that the E.I.s were all obtained under experimental conditions.) In view of the above discrepancies it cannot be taken for granted that the two types of image obtained in this investigation are identical with the two types obtained by Jaensch, but there are certain points of agreement. Jaensch states that the weaker type can be acquired and that the rich type, which is the true type of E.I., becomes less frequent with increasing age. He further believes that the appearance of the weaker type of image is due to injurious factors such as an unsuitable form of education, which does not favour the prolonging of youthful characteristics. If it can be established that the type of education materially affects the prevalence of eidetic imagery as thus suggested by Jaensch, then the small percentage of true E.I.s obtained in this investigation is a matter for serious consideration.

VI.—SUMMARY OF CONCLUSIONS.

(1) A reliable statistical account of the prevalence of eidetic images is possible.

(2) Over 60 per cent of children between 10 and 14 years, in the locality in which the tests were performed, fail to get any image, on a grey background, after regarding a silhouette picture with non-fixation.

(3) Less than 10 per cent of the children tested get images rich in detail and of several minutes' duration.

(4) Among those who do get images there is a gradation from very weak to very strong images. Many of the images obtained are so weak, possessing such a small amount of detail and having such a short duration, that it is doubtful whether they can be regarded as E.I.s. (There is a striking difference between these and some of the images which lasted from five to ten minutes.)

(5) The high percentages obtained by many of the previous investigators are due to including not only weak images as E.I.s, but also to the accepting of latent eidetic ability as a criterion of the eidetic disposition. The large differences in the frequency obtained in different districts are due not merely to local variations, but also to the different scales of measurement.

(6) Roessler and Jaensch consider that eidetic ability is stronger and more frequent among young children. Most of the other investigators consider that the peak of the eidetic ability is at the age of 11-12 years. It has been demonstrated in the present investigation that these contradictory beliefs are probably due to the adopting of different standards for determining which of the images are E.I.s. If only the richest and most stable images are counted as E.I.s then it can be shown that eidetic ability is most frequent at the youngest ages tested. But if the " pass standard " is made a little lower so that images of a rather inferior type are included then E.I.s are found to be most frequent from 11-12 years.

(7) To state that such and such a percentage of children are eidetics is meaningless, for, in the first case, the percentage depends upon the "pass mark" chosen, and, secondly, the percentage given will probably include two different types of E.I. which ought not to be grouped together. It certainly appears that there are two types of E.I., one which is very prevalent among young children and decreases with increasing age, and one which is not so rich in detail, which does not show such marked divergencies from normal A.I.s and which becomes more frequent with increasing age up to 14 years.

(8) The chief result of this investigation is that E.I.s which differ markedly from A.I.s are found to be more prevalent among young than among older children, over the range of ages tested.

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RÉSUMÉ.

UNE ÉTUDE QUANTITATIVE DES IMAGES DITES "EIDETIC."

Le but de cette enquête fut d'inventer un système pour classer les sujets "eidetic" de façon à déterminer l'étendue de l'aptitude "eidetic" évidente parmi des enfants d'âge scolaire, et, en passant, de démontrer les variations dans cette aptitude selon l'âge, de dix à quatorze ans. Les données obtenues démontrent que non seulement l'étendue, mais les variations dans l'étendue, selon l'âge, dépendent du type d'image choisi comme image "eidetic." Si l'on considère comme E.I.'s seulement les images très fortes, alors la fréquence diminue comme l'âge augmente, mais, si l'on considère comme E.I.s toutes les images obtenues par la non-fixation, quelque faibles qu'elles soient, alors la fréquence atteint son maximum entre onze et douze ans. De plus il paraît qu'il y a deux sources de E.I.s. L'une fournit des E.I.'s riches en détails, de longue durée et dont la fréquence diminue à mesure que l'âge augmente. L'autre fournit des E.I.s différant peu des A.I.s normaux, et dont la fréquence augmente de dix à quatorze ans en même temps que l'âge.

ZUSAMMENFASSUNG.

EINE QUANTITATIVE UNTERSUCHUNG EIDETISCHER VORSTELLUNGEN.

Diese Nachfrage sollte ein gültiges System aufstellen, Eidetiker so einzuteilen, dass man das Vorkommen der offenbaren eidetischen Fähigkeit unter Schulkindern feststellt und zur gleichen Zeit das Variieren dieser Fähigkeit mit dem Alter in der Zeitspanne von 10-14 Jahren beweist. Die erzielten Resultate zeigen, dass nicht nur das Vorkommen, sondern auch die Art, in welcher dieses mit dem Alter variiert, von der Art des Bildes abhängt, das als eidetisch gilt. Wenn nur die sehr starken Bilder als eidetische gewählt werden, klingt die Häufigkeit mit zunehmendem Alter ab, aber wenn irgendwelche nicht durch Fixation ermittelte Bilder, seien sie auch noch so schwach, als eidetische Vorstellungen angesehen werden, hat die Häufigkeit ihr Maximum von 11-12 Jahren. Ausserdem bestehen anscheinend zwei Quellen für eidetische Bilder. Die eine veranlasst eidetische Bilder, die an Einzelheiten reich und von langer Dauer sind und deren Häufigkeit mit zunehmendem Alter abnimmt. Die andere Quelle ergibt eidetische Bilder, die sehr wenig von normalen Nachbildern abweichen und deren Häufigkeit mit wachsendem Alter in der Zeitspanne von 10-14 Jahren zunimmt.

SOCIAL STATUS AND THE MORAL DEVELOPMENT OF THE CHILD.

By M. R. HARROWER

(*From the Department of Psychology, Bedford College, University of London*).

Introduction.

I.—*Historical introduction to the problem: Piaget's point of view.*

II.—*Piaget's experimental treatment of the child's conception of punishment and cheating.*

III.—*Experiments with children from the London County Council School, Marylebone, and the Byron House School, Highgate.*

(*a*) *Quantitative results.*

(*b*) *Protocols and individual answers.*

Summary.

INTRODUCTION.

THE experiment to be reported in these pages is essentially a " control " rather than an original investigation. Stated briefly, its purpose has been this: we have repeated almost exactly some of the latest work of Piaget, to discover first, whether his results and conclusions will be identical, similar or dissimilar to those obtained with children of a different nationality: and secondly, by carrying out the experiment with two different social groups, to discover whether or not Piaget has minimized the environmental factor, and by dealing only with children from one social stratum, has made too sweeping generalizations.

It is obvious that an account of our work cannot be given unless it is shown up against that of Piaget, and again, this particular investigation of Piaget's must be seen as belonging in his more general plan. By way of historical introduction we will begin, therefore, by outlining some of Piaget's main findings, and showing his conclusions in this particular investigation with reference to his general scheme. From this it will be easier to see how it has been possible to ask from our present investigation certain specific questions, formulating them so that our quantitative results may be seen as giving an answer to them.

I.—HISTORICAL INTRODUCTION TO THE PROBLEM: PIAGET'S POINT OF VIEW.

" Whether we wish it or not, the questions we have had to discuss in connection with the morality of the child take us to the very heart of the problems studied by contemporary sociology and social psychology," so says Piaget (1), and the question he has been discussing, and which it has been the purpose of these experiments to carry further, has been the development of such ideas as justice, fairness, and rightness in the mind of the child.

To anyone who has followed Piaget in his other work, it will be obvious that for him these questions form part of his whole scheme, which we might call the reconstructing of the world of the child from the child's own point of view. And we shall expect that stages which he may find in the study of the development of moral ideas will not be unrelated to the stages he has found in the development of thought, language, and reasoning: concepts such as the child's ego-centricity, and child realism, which have been used to explain certain aspects of child thought and behaviour, will again be needed in explanation in the sphere of moral development. In short, for those who are in sympathy with Piaget's concepts and interpretation of child life, this added evidence in yet another sphere of development will be like new cement, welding together even more firmly the already interlocking factual structure. And those who disagree will again raise the query as to whether, if one of these interlocking facts is proved false, the whole structure will not collapse.

It is naturally impossible to give an adequate account of Piaget's work in a few pages: we must emphasize only those aspects which are needed to give some general framework. In " Language and Thought of the Child " we have a record of children's conversations which have revealed the fact that roughly 40 per cent of all utterances of the child under seven years old, are in Piaget's term, " ego-centric speech ": speech, that is, which is not an endeavour to communicate something to another being, or to establish a connection between the child and another being, but is simply the accompaniment of the child's actions, and satisfies some of the child's needs at the moment. In *Judgment and Reasoning in the Child* this characteristic is again shown; the child, according to Piaget, is incapable of logical argumentation, and incapable of seeing a point of view that is not his own, until this ego-centricity is broken down. In *The Child's Conception of the World*, and *The Child's Conception of Causality* we have revealed in greater detail the stages which occur during the shift from a pre-logical to a logical reasoning. Answers to questions about the causes of certain physical phenomena have revealed nine different types of " pre-logical causality." Questions as to the origin of things such as the sun and trees have revealed " child artificialism "; questions about what has life and consciousness have revealed " child animism "; while questions on the nature of dreams and the origin of names have shown us " child realism."

Ego-centricity, realism, animism, and pre-causality are four characteristics of child mentality : what does each imply ? Ego-centricity is perhaps the corner-stone of the child's whole mental structure, a structure which is different in kind from that of the adult. It also might be said to contain or explain to a great extent some of the other characteristics. Generalizing from many examples it would mean something like this : the child feels no barriers between himself and the world, he confuses his own thought with the thought of others, confuses what he thinks with what he thinks about. He feels no desire for explicit contact with others, he is understood by the adult, even when his language is inadequate, and he assumes that he both understands and is understood by other children even when this is not the case. His actions monopolize his attention, and his speech is in many cases simply an accompaniment of these. The world appears as his world, there can be no different points of view.

When things happen in the world he expects the cause to be similar to that which he knows when he makes things happen. Ego-centricity will diminish only when the physical world forces its unyielding structure on him, its " otherness " to himself ; and when social contact forces him to see other people's wishes, points of view and positions.

Child realism consists particularly in this ignoring the existence of the " self," and therefore regarding his own perspective as immediate and absolute : and again, from this, a tendency to fix in objects, characteristics which are the result of the activity of the thinking subject. The questions which have, by their answers, led Piaget to form such a concept, have been concerned, for example, with " where a dream takes place." Here Piaget finds three stages, stages of diminishing realism. The first stage shows that the child thinks of the dream as being both of external origin, and taking place outside, in the room. The second stage shows the child as realizing that he has " made " the dream himself, but still looking on it as taking place outside him : a third stage shows a recognition of the internal origin and locus of the dream.

By child animism Piaget means not so much that the child explicitly endows everything with life, but that he sees no reason to suppose that action is the outcome of anything other than what makes his own action, namely motivation. He is aware that he wants to move, and moves ; therefore the moving leaf moves because it wants to, and is, in consequence, alive. Questions concerning " what has life" and " what is conscious " show a gradual shift through several stages, from " everything that moves," through everything that " moves of itself," to animals and plants.

Pre-causality may perhaps be exemplified by three of the nine types : Participation, phenomenistic causality, and magical causality. The child in this case answers questions, which require an answer in terms of some physical cause, in such a way as to show a belief that, in the first, things with equal properties can act from a distance on each other, and thus " cause " each other. In the second, it is the mere contiguity of two events which is sufficient to establish one as the cause of the other, in the third the child considers his own gestures as charged with potency, he himself making things happen.

What is common to all these results, and what we particularly want to draw attention to, are the different types of answers given by the children at different ages, or stages of development ; and it is not surprising to find that the questions dealing with morality give rise to answers which have their place in the general scheme. Diminishing " egocentricity " and " realism " for example, which are evidenced in problems of causality and origin, will also be evidenced in changing moral conceptions.

The specific topics round which the questions of this latest investigation have been built were : the rules of a game, cheating, punishment, fairness and unfairness. The general shift that is occurring is one from a "heterogeneous system of ethics" to an " autonomous " one. In other words, we find at first that the rules of the game are obeyed, and correspondingly regarded as unchangeable, because they are imposed from outside by an omnipotent adult. Cheating is declared wrong because the adult has pronounced it so. Punishment is something arbitrary but inevitable, again imposed by the adult for the purpose of atoning for the guilt. Gradually this heterogeneous ethics gives way to an autonomous system, a system which is built up through the co-operation of the children one with another.

These two systems of morality are perhaps best contrasted in Piaget's own words : " The ethics of authority, which is that of duty and obedience, leads, in the domain of justice, to the confusion of what is just with the content of established law, and to the acceptance of expiatory punishment. The ethics of mutual respect, which is that of good (as opposed to duty) and of autonomy, leads in the domain of justice to the development of equality, which is the idea at the bottom of distributive justice and reciprocity. Solidarity between equals appears once more as the source of a whole set of complementary and coherent moral ideas which characterize rational mentality " (*Moral Judgment*, p. 324).

In the autonomous system of ethics, to go back to the experimental evidence, the rules are obeyed (or can be changed) because they belong mutually to the players, and exist for their benefit. Cheating is unfair to the other fellow, and therefore wrong, and later it is " stupid," because one does not learn in that way. Punishment becomes a means by which a restitution may be made to the person wronged. It is easy to see how this is related to what was said before : for, as the child begins to co-operate with his companions, in itself a sign of decreasing ego-centricity, an inner system of ethics takes the place of the arbitrary and external one. It follows from this that " the sense of justice, though naturally capable of being reinforced by the percepts and example of the adult, *is largely independent of adult influence, and requires nothing more for its development than mutual respect which holds between children* " (*M.J.*, p. 195).

In this last sentence we have the point where our control is needed. Just how much can the " percepts and example of the adult " break through and disrupt the progression of the idea of justice which requires "nothing more than the mutual respect which holds between children" in order to develop? We may now state more specifically our twofold problem.

The first place where our results might prove of interest, be they similar or dissimilar, lies in the fact that the children are of different nationalities. Looked at purely speculatively for a moment, we might find, for example, that there was no trace of such " stages " as those found by Piaget among the Swiss children. It might be that the children would not even give answers that could be classified under Piaget's headings, let alone follow the progress of development as outlined by him. Our first problem then is to discover whether national characteristics and traditions in any way affect what must be considered as a pattern of mental development largely independent of external influences.

The second problem deals with the question of whether perhaps Piaget has not got a great deal of adult influence at work, but cannot isolate it as a factor since it is uniform throughout. In other words, may it not be that in comparing similar age groups from a different social level, subject to adult influence of a different kind, we may find either an accelerating of the stages, or even different types of classifications required. It is only fair to Piaget to say that he admits the possibility that with another cultural group, other results might be obtained, but in the face of such an admission he seems almost to contradict his statement on the all important factor of co-operation, which is, of course, common to groups of all cultured levels, and which is synonymous with the decrease of ego-centricity. This problem seems to be the more important of the two.

II.—PIAGET'S EXPERIMENTAL TREATMENT OF THE CHILD'S CONCEPTION OF "PUNISHMENT" AND "CHEATING."

Let us now turn to Piaget's treatment of those two topics, the nature of punishment and cheating.

Cheating.

The questioning in the case of finding out the child's ideas as to the moral status of cheating seems to have been rather flexible. Piaget quotes himself as asking such questions as " Why must you not copy from your neighbour? " and again "What do you think about cheating?" The child is quite free to develop his own ideas, and not, as in the case of the questions on punishment, simply asked to choose between three alternative answers. Piaget finds three types of answers in this investigation, answers which in his own words " show a gradual diminution in the preoccupation with authority and a correlative increase in the desire for equality." The three headings which he uses to classify his types of answer are :

(1) It is forbidden (it is naughty, it is a lie, it is cheating).

(2) It is contrary to equality (it does harm to a friend, it is stealing from him).

(3) It is useless, because one does not learn oneself.

(*M.J.*, p. 287.)

There are three quantitative statements which we shall need later on in our comparison. They are :

(1) That the percentage of answers in terms of authority (Stage 1) decreases with age in the following manner :

Age	6-7	8	9	10	11
Per cent....	100	80	88	68	32

(2) That the percentage of answers in terms of " it is useless " (Stage 3) increases in the following manner :

Age	10	11	12
Per cent ..	5	4	25

(3) Answers that dwell on " equality " gain in frequency from 8 to 12 years.

Age	8-9	10	11-12
Per cent ..	16	26	62

"In the main, therefore, equality grows stronger with age, whereas the importance of adult prohibition decreases in proportion,"—Piaget (*M.J.*, p. 287).

There is one remark in Piaget's text at this stage which requires a comment. He considers that the answers in terms of "it is useless," "one does not learn oneself," etc., which do not appear until ten at the earliest, are simply repetitions of what some teacher has said. This seems very strange. In the first place why should this mere repetition be higher at twelve years old than ten and eleven; and why, when the youngest age is that which is pre-eminently occupied with authority and what authority has said, should there be no trace of this kind of answer until ten years old. Again, if Piaget assumes that this is solely the result of something a teacher has said, he is not correct in stating that the influence of adult prohibition decreases with age.

Piaget gives as examples of these types of answers:

(1) *Appeal to Authority.*

(Why must you not copy . . . ?) The master rows us . . . teacher punishes us . . . because it is naughty . . . it's bad.

(2) *Appealing to Equality.*

"It's stealing her work from her . . . The girl beside her might get it right . . . You ought to try and find out for yourself."

Our criticism of Piaget's interpretation of the "one does not learn oneself" type of answer leads also to our re-classifying his examples under "Appealing to Equality": for, in our opinion, the only one of these answers which "appeals to equality" is the first, namely, "It's stealing her work from her." "The girl beside her might get it right" is surely much more akin to the arbitrary appeal to authority, characteristic of the first stage, for there is nothing which intrinsically suggests the wrongness of the act in this mere statement of fact. While the third example, "You ought to try and find out for yourself," is an answer which, according to Piaget's reckoning, is simply a repetition of what the teacher has said (cf. "one does not learn oneself") but, according to our impression it belongs in a more advanced type of answer, with for example, "Because you don't think for yourself," and "Because you never learn that way." These answers, from the manner in which they were spoken, and from the general explicitness of the point of view being put forward, we found impossible to interpret in terms of mere repetition.

Our classification, therefore, contained four groups: (1) The appeal to authority; (2) The factual statement of what might result ("If you cheated you might get it right"); (3) Violation of equality; and lastly (4) The answers in terms of failure to learn.

Punishment.

With regard to punishment the procedure adopted by Piaget is somewhat different. The child is told a story which involves the punishment of a little boy or girl, the child is asked to choose from some suggested punishments the one he considers the fairest. The child is then asked why he thinks it is the fairest. The punishments suggested contain both arbitrary expiatory punishments, and punishments by reciprocity: to use Piaget's words " Expiatory punishment has an arbitrary character, arbitrary in the sense that in linguistics the choice of a sign is arbitrary in relation to the content of the thing signified, that is to say, there is no relation between the content of the guilty act and the nature of its punishment . . . in contrast to expiatory punishment, punishment by reciprocity is, to use the terminology of linguistics again, necessarily motivated; misdeed and punishment, that is to say, are related in both content and nature, not to speak of proportion kept between the gravity of the one and the rigour of the other." (*M.J.*, p. 203). Examples which he gives, and which we ourselves have used, will be given later.

Piaget's Results.

For Piaget's results we may turn to three sources. First we have some statistics (to which, however, he himself does not attach much importance) showing that punishment by reciprocity increases in the following proportions:

PUNISHMENT BY RECIPROCITY.

Age	6-7	8-10	11-12
Per cent ..	28	49	82

The percentages are those of the total number of answers.

The second source is that of the protocols: examples are given of those children who voted for " expiatory " or " reciprocal " punishment. We give the ages of the children whose remarks are quoted.

EXPIATORY.

6	7	7·6	8	9	10
6		7·6	8		
6		7·6	8		
		7·6			

Reciprocal.

7	7·6					
	7·6	8	9·6	10	11	12·6
					11	

By arranging them in this way it can be seen at a glance that there is a shift, though we feel rather a slight shift, towards "Reciprocal" answers by the older children.

The third source is Piaget's statements in his conclusions of "the three great periods of development of the sense of justice in the child," "One period lasting up to the age of 7-8, during which justice is subordinated to adult authority ; a period contained approximately between 8-11, and which is that of progressive equalitarianism, and finally a period which sets in towards 11-12 and during which purely equalitarian justice is tempered by considerations of equity . . . In the choice of punishments (during the 7-8 period) expiation takes precedence over punishment by reciprocity. (During the second period . . .) the idea of expiatory punishment is no longer accepted with the same docility as before, the only punishments accepted as really legitimate are those based on reciprocity. Towards 11-12 we see a new attitude emerge, which may be said to be characterized by the feeling of equity, and which is nothing more than the development of equalitarianism in the direction of relativity " (*M.J.*, pp. 314, 15, 16)

All these results, taken together, give us a fairly clear idea of Piaget's conception of development of the moral sense in the child.

III.—THE EXPERIMENT WITH THE CHILDREN FROM THE LONDON COUNTY COUNCIL, MARYLEBONE, AND THE BYRON HOUSE SCHOOL, HIGHGATE.

(*a*) *Quantitative Results.*

Since our experiment was both a repetition and a control, the types of children we questioned as compared with those questioned by Piaget, and the relation of our two groups to each other, are of importance. In the first case, we had from Piaget's own statement to choose a group coming from definitely poor homes. Piaget's children came from "The poorer parts of Geneva and a few children from the elementary school at Neuchatel" (p. 208, 9). As near as one can judge the L.C.C. schools approximate to the Swiss elementary school; and undoubtedly the children came from the "poorer parts of London." Our control group, the children from the Byron House School, however, were from distinctly well-to-do homes and the children of cultured parents.

In each school we had two main groups :

The 5, 6, 7 year old groups .... L.C.C. and B.H.S. I.
The 8, 9, 10 year old groups .... L.C.C. and B.H.S. II.

Each child in the Byron House School was "matched" with one from the L.C.C. who was the same age to a month exactly in Group 2, and almost to a month in Group 1.

We set no particular store by this " matching," and certainly have made no attempt to make individual comparisons ; it was simply a means of procuring two groups which were composed of almost identical members as far as age went.

Our procedure was as follows : The children came alone (except in one or two cases) to see the experimenter in a small room. It was considered rather a privilege and an excitement to come, and very rarely was a child shy. The first few minutes were spent in looking at pictures (puzzle pictures of psychological interest, to be exact) then the child was told a story, and asked to " choose the punishment for the naughty boy " at the end of it. The story was taken from Piaget, as also the punishments, with only very slight alterations.

THE STORY AS TOLD TO THE CHILDREN.

" One day Tommy and Peter were playing together, and Peter had a lovely new engine . . . one that you wind up and then it runs along the floor. Now Tommy was a naughty little boy, and suddenly he kicked Peter's engine, and smashed it up so that it could not go any more. Now what shall we do to the naughty Tommy ? Shall we smack him, or shall we break up his boat, or shall be make him save up his pocket money until he can buy Peter another engine ? "

The fact that these experiments are a control, necessitates that our procedure, and where possible our terminology and classification, must be the same as Piaget's. At this point we should make explicit, therefore, that we are not in total agreement with Piaget in either of these respects.

With regard to the procedure we found much that was artificial in the purely verbal questioning of the child ; our own suggestion would have been, for example, to have dramatized certain of the problem-situations, or at least related them more closely to the individual experience of each child. As far as the classifying of the answers is concerned, we would raise the criticism that the headings " Expiatory " and " Retributive " punishment, do not convey, in English at least, quite the correct meanings. Certain characteristics of the "Expiatory" type of punishment (as contrasted with the Retributive) are, as a matter of fact, characteristic of Retributive punishment as described by such a writer as Ewing.

We have offered here three types of punishment. The first " smack him " (sometimes varied with send him to bed) is essentially *Expiatory and Arbitrary* (of Piaget's description, p. 203). The second is what Piaget has termed *reciprocity proper* . . . the exact equality, the doing to the child what he himself has done. The third we call, after Piaget, *restitutive punishment* . . . " Here censure no longer plays any part, and justice is satisfied with a simple putting right of the material damage " (*M.J.*, p. 207).

Having chosen his punishment the child was then asked why he had chosen it, or why he considered it the fairest. In the investigation on Cheating we adopted the same kind of general questions as Piaget seems to have done.

Everything that the child said was taken down verbatim. Our questions were never identical in each case, being dependent on what each child said, some, for instance needed " drawing out " ; with others it was difficult to stem the tide once it had been started.

In presenting our answers we give first the quantitative results and draw the immediate conclusions which they warrant ; we then amplify these by examples and discussions in a later section. In studying these results we must bear in mind our two questions, first, are Piaget's results verified, his stages exemplified, in the L.C.C. groups which are the equivalent to his Swiss children? Secondly, how do the children from a different environmental setting compare, are the stages here the same, or can their results not be classified in this way ?

TABLE IA.

ANSWERS ON PUNISHMENT.

Ages : 5.7 to 7.9.
Number of children : 26 in each group.

	Expiatory.		*Reciprocity Proper.*		*Restitutive.*	
	L.C.C.	*B.H.S.*	*L.C.C.*	*B.H.S.*	*L.C.C.*	*B.H.S.*
No.	16	6	3	4	7	16
Per cent	61·5	23·1	11·5	15·4	27·0	61·5

TABLE IB.

Ages: 7.11 to 10.7.
Number of children: B.H.S., 20 ; L.C.C., 40.* $\frac{\text{(L.C.C. results)}}{2}$

	Expiatory.		*Reciprocity Proper.*		*Restitutive.*	
	L.C.C.	*B.H.S.*	*L.C.C.*	*B.H.S.*	*L.C.C.*	*B.H.S.*
No.	2	0	6·5	3	11·5	17
Per cent	10	0	32·5	15	57·5	85

These statistics are of course an incomplete record ; there is an inevitable simplification and " sharpening of edges " that is unjustifiable unless examples from the actual protocols are given in addition. None-theless since this crudeness exists for both groups equally, we can at least make comparisons.

From the results contained in Tables IA and IB we can say that the L.C.C. groups undoubtedly corroborate Piaget's statements. In Group 1 (Table IA) for example, we have 61 per cent of the answers given for the Expiatory type of punishment, and this decreases in Group II, as Piaget claims it should (Table IB) to 10 per cent. Further, we have the two types of reciprocity increasing from 11·5 per cent to 32·5 per cent (R.P.), and from 27 per cent to 57 per cent in the Restitutive category.

We have answered our first question in the affirmative. But can we say that the B.H.S. distribution of answers allows of the same summing up? It does not seem so. First of all, in this case, 61·5 per cent, the highest figure, is not for Expiatory punishment at all, but for the most advanced idea of Reciprocity; and again, the distribution of answers is not different in the two age groups (Tables IA and IB) as it was for the L.C.C. children, in all essentials these two distributions are the same. There are admittedly more expiatory answers in the younger group, but the majority of answers are in both cases for Restitutive punishment, as is evidenced by the following extracts from Tables IA and IB.

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* Since it was possible, among the L.C.C. children, to find two of exactly the same age as each Highgate child in this group, we used double the number of L.C.C. children, treating the results by dividing the numbers by two, for any given group. Hence when ·5 occurs in the L.C.C. figures it is always the result of this division, on the occasions when it occurs in the B.H.S. figures, it is because an answer contained the essentials of two categories, and was therefore placed as a half in each. This double type of answer did not occur in the L.C.C. groups.

COMPARISON OF THE TWO AGE GROUPS IN B.H.S.

Ages.	*Expiatory.*	*Rec. Proper.*	*Restitutive.*
	Per cent.	Per cent.	Per cent.
5- 7	23	15	61·5
8-10	0	15	85

All theoretical implications apart then, we may say that the distribution of answers in the two L.C.C. groups and the two B.H.S. groups are different, and we must answer our second question in favour of there being an important environmental factor at work.

Let us now consider the Cheating answers (cf. pp. 12, 21).

TABLE IIA.

ANSWERS ON QUESTIONS ON CHEATING.

Ages : 5.7 to 7.9.
Number of children : B.H.S. and L.C.C., 26.

	Appeal to Authority.		*" Right : Wrong : Same."*		*" Not Learning."*	
	L.C.C.	*B.H.S.*	*L.C.C.*	*B.H.S.*	*L.C.C.*	*B.H.S.*
No.	16	9	6	5	4	12
Per cent	61·5	34·6	23	19·2	15·4	46

TABLE IIB.

Ages : 7.11 to 10.7.
Number of children : B.H.S., 20 ; L.C.C., 40. $\frac{\text{(L.C.C. results)}}{2}$

	Appeal to Authority.		*Right, Wrong.*		*Violation of Equality.*		*" Not Learning."*	
	L.C.C.	*B.H.S.*	*L.C.C.*	*B.H.S.*	*L.C.C.*	*B.H.S.*	*L.C.C.*	*B.H.S.*
No.	5	1	1·5	3	11·5	6	2	10
Per cent	25	5	7·5	15	57·5	30	10	50

Taking first the L.C.C. groups, we find Piaget's results again confirmed. The arbitrary appeal to authority has in the younger group the highest per cent (61·5), this percentage decreases to 25 per cent in the older group. A shift has occurred, but the highest percentage in the older group is not that of the " Not learning " type of answer, but that of the " Violation of Equality," that is the wrongness lies in the unfairness to the neighbour, and not in the hampering of oneself by failure to learn. This exactly bears out Piaget's statement that answers of this kind increase between the ages of eight and twelve.

Again, and as with the answers on punishment, the distribution of answers for the B.H.S. groups are different from the L.C.C. In the younger group there are fewer arbitrary appeals, fewer that is, than among the L.C.C. children of the same age, *and* fewer than the number of answers of the most advanced type, that of defeating one's own purpose. In the older group the B.H.S. children have a much higher percentage of this last type of answer than the L.C.C. children of equal age ; 50 per cent as compared to 10 per cent.

Comparing the transition from the younger to the older group in the case of the L.C.C. and B.H.S. respectively, we see that there is a much greater " shift " away from an arbitrary ethics of authority in the L.C.C. In fact it is even questionable whether we can speak of a shift as occurring in the B.H.S. children at all. For even among the youngest ones the percentage for the most advanced type of answer is 46 per cent (compared with the 50 per cent of the older ones). There is certainly no evidence of Piaget's 100 per cent in terms of appeal to authority at the age of 6-7 years in this group.

Asking again our two initial questions, we have the answers : Yes, Piaget's stages are exemplified among the equivalent social group ; but among children from a different social level the distribution of answers is quite different.

(*b*) *Protocols and Individual Answers.*

There remain two topics which a study of these tables cannot help with. First the examination of some of the actual protocols, with particular reference to the reasons annexed for the choice of a punishment; and the wording and detail of the answers on cheating. Secondly, a study of the answers of the individual children in both investigations : shall we find, for example, that a child who has chosen the Restitutive type of punishment will also have given the most advanced and developed ideas on the subject of the moral status of cheating ?

We deal now with the first of these topics. In the punishment questions, since the choice was merely an alternative one, we have to rely on the reasons given for the choice in order to get closer to what this choice meant for the child.

Group 1 : L.C.C. and B.H.S.

We can divide the " reasons " for the choice of a particular punishment into three groups. First, those who can give no reason, for whom the question seems meaningless, who will simply reiterate their choice of punishment, varied with an " I don't know why." Secondly, those who state as a fact what the naughty child has done in order to be punished . . . " Because he broke the engine " . . . or announce that " he was naughty."

Thirdly, those who give some answer with reference to the particular punishment. These last, and only relevant answers, are conspicuous by their absence among children of this age in both the L.C.C. and B.H.S. groups. There are, however, certain differences that are worth noting. For example, five out of the eight children who had voted for restitutive punishment in the L.C.C. group, do so in order to avoid the punishment of smacking, or because the transgressor " would mind that least." In other words there is no merit in this punishment except that it is the least unpleasant for the child in question. This seems important, because one surely cannot attach the same importance to a choice of this kind when it is so obviously not the " restitutive element " in the punishment that the child has noticed. It also might be mentioned that they are in direct contradiction to that tendency, described by Piaget, of the youngest children to choose the most severe punishment.

We give two of these answers in full as examples :

J.R. (6.9) : " I should make him buy a new boat . . . " (why would you do that J.) " . . . because he's done a naughty thing . . . and so that he won't get smacked . . . I don't like to see people getting smacked."

O.D. (7.2) : " Make him save up and buy Peter a new boat . . . " (why, etc.) " So that you won't have to smack him . . . better still, just put him to bed."

There is one more answer which is something more than a mere statement of fact, that is J.J. (7.7) who claims that with this punishment Tom will not be able to buy a boat for himself.

The B.H.S. children are a little better in justifying their choices :

B.D. (6.5) : claims that saving up is the best punishment, since now Tom will not be able to get the things he wants for himself (cf. J.J.).

J. (6.2) : repeats firmly that Tom " ought to " save up. Resisting the suggestion that perhaps he " ought to " be smacked, etc. . . . she repeats again that this is the punishment that " ought to " happen.

A. (6.1): in the same way insists that "he *must* buy the boy a new one . . . the other punishments are not nearly so good, so fair."

R. (6.6): "Tom must buy a new one for Peter so that it would be fair again . . . so that Peter could then have something new."

P. (5.7): considers buying a new one "the only thing" . . . and again, "it is the best because then Tom couldn't buy anything for himself *and* (with much emphasis) the new engine for Peter would be bright and new and grand (i.e., Peter well compensated !)

M. (5.7): again thinks of this double aspect. "It is fair to Peter, and it is the best punishment for the naughty Tom."

No one could claim that these answers are adequate justification for the restitutive type of punishment, nevertheless they show something other than a child demanding arbitrary expiatory punishment, as, according to Piaget, a child of this age must do.

Furthermore, they are less negative than the L.C.C. reasons, in addition to being more numerous. In fact, taken with the quantitative results, they justify our claims as to the difference between the two socials groups.

Group 2: B.H.S. and L.C.C.

In the older group we have more material in the sense that there are more reasons offered, but less difference between the L.C.C. and B.H.S., for the distribution of answers is very similar in the two groups.

The reasons that were given may be classed under four headings:

(1) Statement of why the child was punished (as in the younger group).

(2) Statement in terms of the punishment's fairness.

(3) What the punishment will achieve for the transgressor. "Because then Tom would not quarrel."

(4) In terms of the restoration of Peter's *status que.*

The only difference is the fact that the L.C.C. proportion of type 1, i.e., mere statements of why the child was punished, was nearly twice that of the B.H.S. (27·5 per cent as opposed to 15 per cent).

Cheating. Group 1.

In the answers given to the questions on cheating the difference between the L.C.C. and B.H.S. comes out more clearly. We contrast two from the most advanced category—that of "not learning."

The L.C.C. attempts at this idea are exemplified by:

M.C. (7.4): "Because it wouldn't be doing your own work."

P.H. (6.0): "They don't know how to do the sums."

These examples from the B.H.S. seem to be more explicit:

A. (6.1): "If you can't do your own sums you should go down to a lower class."

R. (7.6): "He (the cheater) might get into trouble at a big school because he would not know what he ought to. It does not matter to anyone but himself."

P. (5.7): "Cos they should do their own . . . you must know your tables and everything that is right for a man . . . or you won't be a good man . . . it's not doing things properly that's why it's wrong."

These, again in conjunction with the number of such answers in each case respectively, seem to bear out our conclusions (cf. Table III).

Comparing the statements in the older group (Table IV) we find the chief difference of expression comes in that category which we, after Piaget, have termed "violation of equality." For the L.C.C. children, this general idea (especially characteristic of this age group according to Piaget) is expressed in terms of "It is stealing from the other child," for the B.H.S. children the unfairness is expressed in terms of "Not sporting" and "not fair because the Brownie motto is 'Play the game.'" A very obvious reflection of the different environments.

Very few L.C.C. children mention the fact that the cheater himself suffers, whereas 50 per cent of the B.H.S. children's answers involve this. One more fact is that arbitrary answers still persist to the extent of 25 per cent in the L.C.C. group, and we have only 5 per cent in the B.H.S.

We add here some more examples from the protocols under the various headings:

Appeal to Authority, arbitrary statements of fact.

"Because he looks over his shoulder to see the sum."—L.C.C. (8.8).

"Because it is cheating."—L.C.C. (8.8).

"I will tell teacher it is wrong."—L.C.C. (8).

"Because it is sly."—L.C.C. (8.1).

"It is naughty."—L.C.C. (8.8).

"Right, Wrong" Statements.

"Because he might get the sum right."—L.C.C. (7.11).

"Because you would get them (the sums) all right or wrong."—B.H.S. (8.8).

"Because you would get some wrong and some right."—L.C.C. (7.10).

"Because he would get the sums wrong."—B.H.S. (9.7).

"Because the other person might be wrong."—B.H.S. (9).

Violation of Equality.

" Because you are stealing other people's work."—L.C.C. (9).
" It's unfair to the boy he copies from."—L.C.C. (8.8).
" Because it's stealing the other one's work."—(L.C.C. (9.9).
" Because it isn't sporting."—B.H.S. (8.8).
" Because it's stealing other people's brains."—L.C.C. (10.5).
" Because it isn't fair play."—B.H.S. (8.10).
" Because it isn't sporting to cheat."—B.H.S. (8.11).

Not Learning " . . . " *not your own work,*" *no use, etc.*

" Because they will not learn."—B.H.S. (8.11).
" Because he would not learn anything."—B.H.S. (8.7).
" Because you never learn that way."—B.H.S. (8.11).
" Because you don't think for yourself."—B.H.S. (8).
" Because the girl should learn herself."—L.C.C. (9).

A word must now be added about stages and the individual. One of the things which one misses in Piaget's work is the evidence of what happens to any given child in a series of investigations conducted at the same time. Again, what we might call a longitudinal section, what will be the result of asking the same question to the same child at different ages. Piaget is naturally not concerned with such an individual problem, nonetheless it would seem that if there are certain characteristics of development at different age levels, the majority of children should pass through these stages in a uniform manner; and should roughly be at the same stage for a variety of questions. With this in mind, we inspected our protocols to find if there was any correlation between the type of answer given by one and the same child in the two investigations, and whether one school would show evidence of stages of development to a greater degree than the other.

The results were not very striking, two facts are worth mentioning however. Among the L.C.C. children (ages 8-10) we find that 61·5 per cent of those who condemn cheating in terms of its violation of equality, also demand strict reciprocity in the type of punishment. Among the B.H.S. children we have no correlation whatsoever between these types of answers. The L.C.C. alone are exhibiting the so-called second stage of Piaget.

The other result is of a similar nature. From Tables IA and 2A we have already seen that in both cheating and punishment a larger number of L.C.C. children are at " Stage 1 " than B.H.S. children. But from these tables we cannot tell how many of the same children give " Stage 1 " answers in *both* investigations. A study of the protocols reveals the fact that in this particular case the L.C.C. children are the more uniform, namely, 53·8 per cent of the total number of children give Stage 1 answers to *both* questions ; among the B.H.S. this percentage is only 19·2. Similar analysis of the other stages, and other ages, revealed no striking correlations or differences between the schools, but from these two results it would seem as if, working only with the L.C.C. type of child, as Piaget has done, one would be more likely to emphasize " stages " than when working with a control group.

CONCLUDING REMARKS.

Summarizing our particular findings with reference to our two main questions, we may say: first, that among the L.C.C. children (who are as nearly as possible the social equivalents of Piaget's) we find a distinct similarity between our results and his. But among our control group we find, both quantitatively and qualitatively, a different state of affairs. Here we have a distribution of answers which could not have given rise initially to a scheme such as Piaget's, and which is really incompatible with such a scheme. It would seem, therefore, that the development of the child's sense of justice is not entirely or even primarily dependent on the mere fact of co-operation between children.

Since the amount of our research is very small compared with that of Piaget, any assertion to the effect that our evidence invalidates his work would be out of place. It would seem, however, that we are justified in setting out these two alternatives which we are forced to recognize from the nature of our results.

Either the stages of development which Piaget has been emphasizing are not a universal characteristic of development *per se*, but are to be found only within certain uniform groups, groups which are subject to certain constant conditions ; or, in certain environments these stages can be so far accelerated that children exhibiting characteristics of the third, and most developed, are to be found at the ages of the first.

The first alternative cuts at the heart of Piaget's whole theory ; on the other hand, the second is not without its difficulties. Supposing we accept the second tentatively for the moment, among other things we have to admit that adult influence has played a far greater part than Piaget would allow. But there is something more, for we must then assume that the children of the Byron House School who at the ages of six and seven evidenced the third stage type of answer, had already passed through the earlier stages, and, had we questioned them a year or so earlier, would have shown what we expected to find now.

But in our opinion this is not the case. We questioned several children from the same school who were slightly younger, and found, rather to our surprise, that our questions apparently had no meaning for these children. They appeared to be " deliberating," but then would come out with some completely irrelevant remark.

One word must be said in conclusion : we have spoken throughout as if the different types of school and home owed their difference to specific and definite types of adult influence and teaching, but we are aware that a large part of such influence is indirect, as evidenced for example in the "spirit" of the schools and the atmosphere of the homes. This difference in intellectual atmosphere would seem to us to be of the utmost importance, and Piaget's work to lose in value through his often dangerous attempt to get below what a child may be said to have picked up from the adult. For surely the very fact that a child will "imbibe " some parts of his intellectual atmosphere and not others, and again, that children must inevitably grow up in different atmospheres, and be subject to different influences, is of great importance in the study of development. We consider that the small amount of evidence afforded by this study lends support to this view.

RÉSUMÉ.

LE RANG SOCIAL ET LE DÉVELOPPEMENT MORAL DE L'ENFANT.

Cette enquête répéta les questions posées par Piaget à des enfants d'âges variés quant à leurs idées sur la Punition et sur la Tricherie. Les enfants interrogés appartenaient à une école primaire municipale de Londres, l'équivalent social, à peu près, des enfants de Piaget, et, comme groupe de contrôle, à une école recrutant ses élèves d'une classe sociale supérieure. Tandis que les enfants de l'école municipale se développaient et répondirent aux questions d'une façon très semblable à ceux de Piaget, les enfants du groupe de contrôle firent des réponses qui, aussi bien par leur nombre que par leur qualité, semblaient incompatibles avec ce classement de Piaget. Il paraît donc, que le développement du sentiment de la justice chez l'enfant ne dépend pas entièrement, ni même en premier lieu, de la " co-opération " entre enfants, mais que le milieu et l'influence spécifique de l'adulte y jouent un rôle considérable. On est amené à en conclure où que les phases du développement, qui forment une partie si importante de l'interprétation de Piaget, ne sont pas un trait universel du développement en soi, mais se manifestent seulement dans certains groupes uniformes, où que, dans certains milieux, ces phases peuvent s'accélerer jusqu'au point où l'on trouve des traits des plus développés à l'âge des premiers.

ZUSAMMENFASSUNG.

GESELLSCHAFTLICHE ZUSTÄNDE UND MORALISCHE ENTWICKLUNG DES KINDES.

Diese Arbeit wiederholt eine Untersuchung von Piaget über das kindliche Rechtsgefühl, in der Kinder verschiedenen Alters über ihre Ideen von Strafe und Unehrlichkeit (mogeln) befragt wurden. Unsre Kinder kamen zu einem Teil aus einer London County Council Schule (sozial ähnlich gestellt wie die von Piaget untersuchten Kinder), zum anderen Teil, als Kontrollgruppe, aus einer Schule höheren sozialen Niveaus.

Die Kinder aus der L.C.C. Schule beantworteten die Fragen durchaus ähnlich wie Piagets Kinder und zeigten die gleiche Form der Entwicklung; die Antworten der Kontrollgruppe dagegen waren qualitativ und quantitativ so anders, dass sie mit Piagets allgemeinem Schema unvereinbar sind.

Die Entwicklung des kindlichen Rechtasgefühls scheint daher nicht allein, nicht einmal überwiegend, durch den Verkehr der Kinder mit einander bestimmt zu sein, sondern auch wesentlich von der ganzen Umgebung und dem spezifischen Einfluss der Erwachsenen abzuhangen. Man wuss weiter schliessen, dass entweder die Entwicklungsstufen, die eine so wichtige Rolle in Piagets Theorie spielen, nicht für Entwicklung schlechthin gelten, sondern nur bei gewissen gleichförmigen Gruppen auftreten, oder dass das Entwicklungstempo durch besondere Milieu-Einflüsse so beschleunigt werden kann, dass Merkmale der höchsten Stufen schon auf den niedrigsten Altersstufen gefunden werden.

ANALYSIS OF SOME PSYCHOLOGICAL TESTS BY THE SPEARMAN FACTOR METHOD.

BY C. JORGENSEN.

I.—The analysis of psychological tests.
II.—Description of tests examined.
III.—Intercorrelation of tests and analysis into factors.
IV.—Discussion of results.
  (*a*) *Intelligence tests.*
  (*b*) *Special ability tests.*
  (*c*) *The reliability of the Spearman methods of analysis.*

I.—THE ANALYSIS OF PSYCHOLOGICAL TESTS.

PARTICULARLY in the United States, but also in European and other countries, much money and time have been expended on tests and testing, and very often little has been known of the nature and validity of the tests used. Of course the validity of many tests has been investigated, but for intelligence tests no satisfactory criteria have been available, and, therefore, a resolution into factors would be a useful check on the validity of such tests, and would give further useful information concerning their nature.

The possibility of using the Spearman method suggests itself, for, in spite of its weaknesses, it appears to be the most suitable technique we have for the purpose. Such an analysis of some American psychological tests is outlined on the following pages. It must be remembered, however, that in this analysis two major assumptions have been made. One is the validity of the Spearman methods, and the other is the universality of "g" and its identity with what is commonly meant by "general intelligence." However, these assumptions are not sufficiently serious to make it inadvisable to proceed with the analysis. The analysis, itself, can be made to throw some light on the reliability of the methods used, for if certain tests occur in more than one group, approximately the same values of "g" and other factors should be found in each case.

II.—DESCRIPTION OF TESTS EXAMINED.

In this analysis the following tests and grouping were used:

Group I.

Army Alpha (1925 revision).
Otis, test for business establishments.

Teaching Aptitude (George Washington Series).
Examination in Clerical Work (Thurstone).*
Technical Information (Thurstone).
Test for Mechanical Ability (MacQuarrie).†

Group II.

A.C.E. Psychological Examination (1929).
Otis, test for business establishments.
Examination in Clerical Work (Thurstone—each section separately timed).
Technical Information (Thurstone).

Two other groups were analysed. These were obtained by using along with the Army Alpha and the Otis test the seven sub-tests of the MacQuarrie Test for Mechanical Ability in one group, and in the other the A.C.E. Psychological, the Otis test and six of the eight sub-tests of the Examination in Clerical Work.

In analysing the sub-tests it was particularly desired to see if there were in these sub-tests group factors of mechanical and clerical ability. The two intelligence tests were added to each group in order to have available reference values for detecting the presence of overlap. However, difficulty was experienced here. The intelligence tests, though not displaying mutual overlap when grouped along with other complete tests, were, in both cases, found to overlap when used with the sub-tests. Nevertheless, their inclusion in the group, by increasing the number of tests involved, increased the reliability of the measures found.

The tests were all given to groups of freshmen and sophomore students at the College of the City of New York. The size of the groups varied from 136 to 172. All possible precautions were taken to eliminate errors and disturbers of tetrad differences.

III.—INTERCORRELATION OF TESTS AND ANALYSIS INTO FACTORS.

(*a*) *Group I Tests.*

The intercorrelations found for the tests in Group I are given in Table I.

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* See, Thurstone, L.L. *Standard Tests for Office Clerks.—J. App. Psych.* September, 1929, 3, 248-251.

† MacQuarrie, T. W. *A Mechanical Ability Test.—J. Personnel Research*, 5, No. 9. 1926-27, 329-337.

TABLE I.

INTER-CORRELATIONS OF TESTS IN GROUP I.

Number of students=N=172.

Tests.	1	2	3	4	5	6
(1) Army Alpha	—	·43	·38	·30	29	·24
(2) Teaching	—	—	·14	·15	·18	·01
(3) Otis	—	—	—	·36	·14	·18
(4) Clerical	—	—	—	—	·07	·12
(5) Technical	—	—	—	—	—	·14
(6) Mechanical	—	—	—	—	—	—

When the tetrad differences were obtained from this table and compared with the probable error,* no overlap was revealed except between the Army Alpha and the Teaching Aptitude Test where a correlation of specific factors of ·35 was found.†

The correlations of the tests in Group I with their general and specific factors are given in Table II.

TABLE II.

CORRELATIONS OF TESTS IN GROUP I WITH GENERAL AND SPECIFIC FACTORS.

Tests.	*Correlation with general factor.*	*Correlation with specific factor.*
(1) Army Alpha	·73	·68
(2) Teaching	·28	·96
(3) Otis.........................	·57	·82
(4) Clerical	·45	·89
(5) Technical	·33	·94
(6) Mechanical	·29	·95

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* Throughout this analysis Spearman's formula, 16A (*Abilities of Man*, Appendix p. XI) was used, except in certain cases where a more exact measure seemed desirable and where the long formula given by Kelley (*Cross Roads in the Mind of Man*) was used.

† Throughout this study the tetrad criterion was first applied, and then the correlations with g used in the formula, $r_{ab} = r_{ag} \cdot r_{bg}$ which should be approximately satisfied if there is no overlap. In some cases this check made necessary a re-calculation of the correlation with g, though in general it confirmed the findings of the tetrad criterion.

(*b*) *Group II Tests.*

The inter-correlations found for the tests in Group II are given in Table III.

TABLE III.

INTER-CORRELATIONS OF TESTS IN GROUP II.
N=136.

Tests.	1	2	3	4
(1) A. C. E.	—	·59	·48	·24
(2) Otis	—	—	·30	·23
(3) Clerical	—	—	—	·03
(4) Technical	—	—	—	—

When applied to the correlations in this Table, the tetrad criterion did not disclose any overlapping of specific factors. The correlations of the tests with the general and specific factors are given in Table IV.

TABLE IV.

CORRELATIONS OF TESTS IN GROUP II WITH GENERAL AND SPECIFIC FACTORS.

Tests.	*Correlation with general factor.*	*Correlation with specific factor.*
(1) A. C. E.	·98	·14
(2) Otis..........................	·71	·70
(3) Clerical	·40	·92
(4) Technical	·22	·97

(*c*) *The Sub-Tests for Mechanical Ability.*

The inter-correlations found for the sub-tests of the MacQuarrie Test for Mechanical Ability, the Army Alpha, and the Otis test are given in Table V.

TABLE V.

INTERCORRELATIONS OF THE MACQUARRIE SUB-TESTS AND TWO INTELLIGENCE TESTS.

N = 162.

	1	2	3	4	5	6	7	8	9
(1) Army Alpha	—	·37	·06	·08	–·04	·21	·33	·37	·13
(2) Otis	—	—	·03	–·12	–·04	·18	·24	·31	·11
(3) Tracing	—	—	—	·27	·42	·36	·20	·10	·13
(4) Tapping	—	—	—	—	·55	·14	·17	·09	·14
(5) Dotting	—	—	—	—	—	·14	·06	·03	·25
(6) Copying	—	—	—	—	—	—	·46	·35	·41
(7) Location	—	—	—	—	—	—	—	·44	·30
(8) Blocks	—	—	—	—	—	—	—	—	·22
(9) Pursuit	—	—	—	—	—	—	—	—	—

Considerable overlapping of specific factors was found, but no general factor other than "g,"—if, indeed, "g" be common to all. Table VI shows the correlations of each test in this group with its general and specific factors.

TABLE VI.

CORRELATIONS OF MACQUARRIE SUB-TESTS WITH GENERAL AND SPECIFIC FACTORS.

Tests.	*Correlations with general factor.*	*Correlations with specific factors.*
(1) Army Alpha	·40	·92
(2) Otis	·21	·98
(3) Tracing	·17	·98
(4) Tapping	·14	·99
(5) Dotting	·0	1·0
(6) Copying	·68	·73
(7) Location	·80	·59
(8) Blocks	·67	·74
(9) Pursuit	·39	·92

Table VII gives the correlations of specific factors.

TABLE VII.

CORRELATIONS OF SPECIFIC FACTORS.

Tests.	*Correlations of specific factors.*
Army Alpha and Otis (1 and 2)	·32
Tracing and Tapping (3 and 4)	·25
Tracing and Dotting (3 and 5)	·43
Tracing and Copying (3 and 6)	·33
Tracing and Pursuit (3 and 9)	·27
Tapping and Dotting (4 and 5)	·56
Dotting and Copying (5 and 6)	·19
Dotting and Pursuit (5 and 9)	·27
Copying and Pursuit (6 and 9)	·22

Factors other than "g."—There was some evidence of a common factor other than "g" in five of the sub-tests, but the evidence was not strong enough to suggest that this common factor was any more than a possibility. Making the assumption of its presence and calling it C_1, the correlations shown in Table VIII were obtained.

TABLE VIII.

CORRELATIONS OF TESTS 3, 4, 5, 6, and 9 WITH CENTRAL FACTOR C_1.

Tests.	*Correlations with Central Factor C_1.*
(3) Tracing	·72
(4) Tapping	·33
(5) Dotting	·55
(6) Copying	·45
(9) Pursuit	·43

In the Tapping and Dotting tests (4 and 5) still further overlap was undoubtedly present, and, calling this factor C_2 and assuming it to be present to the same extent in each test, each would have a correlation of ·69 with this factor.

The Nature of the Group Factors.—The existence of the common factor, C_1, was not satisfactorily proved, and its nature, if it does exist, is not readily apparent. The situation is different for the group factor C_2 ; its presence can scarcely be doubted, and its nature is very probably that of speed of a certain kind of hand movement.

(*d*) *The Clerical Sub-tests.*

The inter-correlations of the six Clerical sub-tests, the A.C.E. Psychological Examination, and the Otis test for business establishments are given in Table IX.

TABLE IX.

INTER-CORRELATIONS OF CLERICAL SUB-TESTS AND TWO INTELLIGENCE TESTS.

N=143.

Tests.	1	2	3	4	5	6	7	8
(1) A. C. E.	—	·59	·47	·16	·22	·21	·29	·23
(2) Otis	—	—	·24	·07	·07	·04	·26	·15
(3) Spelling	—	—	—	·42	·17	·32	·13	·16
(4) X, Z, U, C.	—	—	—	—	·14	·17	·13	·03
(5) Code	—	—	—	—	—	·27	·33	·11
(6) Alphabetizing	—	—	—	—	—	—	·31	·14
(7) Insurance	—	—	—	—	—	—	—	·06
(8) Arithmetic	—	—	—	—	—	—	—	—

Analysis of the correlations in Table IX revealed overlapping specific factors in four pairs of tests, but no factor other than "g" in more than two tests. The correlations with "g" and the specific factors are given in Table X.

TABLE X.

ORRELATIONS WITH GENERAL AND SPECIFIC FACTORS. CLERICAL SUB-TESTS AND TWO INTELLIGENCE TESTS.

Tests.	*Correlations with "g."*	*Correlations with specific factors.*
(1) A. C. E.	·66	·75
(2) Otis......................	·35	·94
(3) Spelling	·60	·79
(4) X, Z, U, C	·26	·96
(5) Code	·41	·91
(6) Alphabetizing	·46	·89
(7) Insurance	·36	·93
(8) Arithmetic	·26	·96

Table XI gives the size of the overlap of specific factors.

TABLE XI.

OVERLAP OF SPECIFIC FACTORS. CLERICAL SUB-TESTS AND A.C.E. AND OTIS INTELLIGENCE TESTS.

Overlapping Tests.	*Correlations of specific factors.*
A. C. E. and Otis	·51
Spelling and X, Z, U, C	·34
Code and Insurance	·21
Alphabetizing and Insurance	·17

IV.—DISCUSSION OF RESULTS.

(a) *Intelligence Tests.*

Perhaps the most obvious question to be asked of the analysis is which of the three intelligence tests used is the best? It must be remembered, however, that the results obtained, being at the best only approximative, must be regarded as suggestive rather than conclusive. The test that gives the highest correlation with " g " is the A.C.E. Psychological. From the intercorrelations of the Group I tests, this test gave the exceedingly high correlation with " g " of ·98. However, unrevealed overlap with the Otis test or chance fluctuation appears to have raised this correlation above its true level, and the correlation of ·66, found when this test was grouped with the Otis test and the Clerical sub-tests, is probably the better value to accept. The corresponding correlations for the Otis test are ·71 and ·35. Other correlations with " g " found for the Otis test were ·57 and ·21, which correspond with correlations with " g " of ·73 and ·40 for the Army Alpha. Consequently it appears that the Otis test for business establishments and, to a less extent, the Army Alpha cannot be accepted as satisfactory tests of intelligence for college students.

The most interesting test is the MacQuarrie Sub-test, Location, which has the relatively high correlation with " g " of ·80. Of course, it is not known that in another group this test would not have had a correlation with " g " of much less than ·80. However, it is not to be expected that the correlation would be much less than ·80, for the group used contained the rather large number of nine tests. It should also be noted that the coefficient of reliability given by MacQuarrie for this test is only ·72, which would limit the correlation (uncorrected for attenuation) with " g " to something in the region of ·85. Apparently, then, this test would be a very good measure of " g " if its reliability could be increased.

Largeness of Specific Factors.—A point not to be overlooked is the largeness of the specific factors, even for the so-called intelligence tests (see Tables VI and X). There is more that is specific than general, and the value of these tests as means of measuring "general intelligence" is reduced accordingly.

It also appears that the intelligence tests used in this analysis have something in common besides " g " (see Tables VII and XI) but what this is is not known. It may be some verbal or language factor, or it may be due to the greater length of these tests.

Two other comments on intelligence tests can be made. One is that the length of a test, apart from its effect on reliability, has very little to do with its ability to measure " g." In this connection the correlations with " g " of the Army Alpha and Otis tests each requiring thirty minutes can be compared with the same correlation for the Location test, which requires only two or three minutes, ·40 and ·21

(to take only those values from the group in which the Location test appears ; see Table VI.)

Again, it would appear to be a fallacy to hold, as is often done, that a good intelligence test can be constructed out of material that is either equally familiar to all the subjects or entirely foreign to all of them. It is not enough that the above criteria be satisfied. The material must also be highly saturated with " g."

(*b*) *Special Ability Tests.*

The analysis into factors of such ability tests as the MacQuarrie Test for Mechanical Ability and the Thurstone Examination in Clerical Work reveals the fact that the total score obtained in a test comprising very different sub-tests has very little significance, for any given score can be made up in quite a number of ways. In the MacQuarrie test, for instance, three tests are fairly highly saturated with " g," and two others contain little or no " g," but are high in another factor (rapidity of hand movement—perhaps a non-mental factor). An average score on this test could, then, contain high scores on the sub-tests containing much " g " and low scores on the speed of hand movement sub-tests, or vice versa. And, when the influence of the other tests and of other factors, group and specific, is considered, it follows that any total score that is not very high or very low means very little. A certain form of mechanical work may require rapid, precise hand movement, yet a good score in the test could be obtained by a person slow and clumsy with his hands.

Similar objections hold in respect to the Clerical test. Not infrequently, and without greatly affecting the score, one of the sub-tests in this test is omitted, yet this sub-test, say the one in arithmetic computation, may contain something of perhaps paramount importance in some form of clerical work. Consequently, the conclusion seems unavoidable that no test made up of a number of sub-tests and having performance on it represented by a single total score can be considered as a satisfactory measure of ability, unless running through all sub-tests is a strong central factor, and in the two ability tests considered here there is in the one no central factor of mechanical ability and in the other none of clerical ability.

If we are going to test abilities adequately, the best way appears to be through job-analysis, experimentally proved tests each measuring if possible only one factor (or one test containing all the factors and in the same proportion as in the job), determination of critical scores, and the use of the regression equation method to obtain a prognostic rating.

This method is, admittedly, extremely difficult to follow, but, if we are to use imperfect methods, we must do so with full awareness of their limitations, and not, for example, tell a person who has made a very high score on the Thurstone Examination in Clerical Work that he should take up clerical work. Quite likely he should not ! He may be too intelligent for this work, and should, perhaps, not enter upon it, unless it is a necessary step to something else more in keeping with his high intelligence (correlation of this test with " g " was found to be ·45 and ·40 in two separate groups).

(c) *The reliability of the Spearman Methods of Analysis.*

The present analysis is not of a nature that throws much light on the validity of the Spearman methods. There was, however, in the factors isolated no absence of agreement with observation.

Concerning the reliability of the Spearman methods the analysis is more illuminating. Some idea of the consistency of the results of the method of finding a correlation with " g " is obtained from the correlations for the Otis, Technical Information, and Clerical tests in two separate groups of tests given to different subjects. In Group I tests these correlations were ·57, ·33, and ·45, while in Group II tests they were found to be ·71, ·22, and ·40 respectively. There is here some agreement, but it is not particularly close.

Another comparison can be obtained from the different correlations with " g " of the Otis test when grouped with the four groups of tests investigated ; these correlations were ·57, ·71, ·21, and ·35. It is evident that the degree of concordance leaves much to be desired. The overlapping of the Otis test with the other intelligence tests (see Tables VII and XI) in the groups that contain the Mechanical and Clerical sub-tests suggests that the correlations ·57 and ·71 should not be accepted, but it must be remembered that, when these correlations were found, there was nothing to suggest overlap, and, if only Group I and Group II tests had been used, these values would have appeared to be near the true value.

To what extent may the correlation of a test with " g " be subject to fluctuation according to the data from which the correlation is calculated ? This is unknown, but a measure of such fluctuation for Test VIII in Table V is given in Table XII, which represents the various values of correlation with " g " obtained from different combinations of Test VIII with two other non-overlapping tests. Tables similar to Table XII were drawn up for other individual tests, and showed results differing but little from Table XII.

TABLE XII.

VARIATIONS IN CORRELATIONS OF TEST VIII (TABLE V) WITH "G" OBTAINED FROM DIFFERENT GROUPS OF THREE NON-OVERLAPPING TESTS.

Groups of Tests.	*Correlations with "g."*	*Groups of Tests.*	*Correlations with "g."*
813	·79	826	·77
814	·64	827	·75
815	(—·278)$^{\frac{1}{2}}$	829	·79
816	·79	837	·47
817	·70	847	·48
819	·79	857	·47
823	1·02	867	·58
824	(—·232)$^{\frac{1}{2}}$	879	·57
825	(—·232)$^{\frac{1}{2}}$		

Note.—The numbers under "Groups of Tests" refer to Test Nos. in Table V.

With four exceptions all the correlations in Table XII lie in the not very wide range of ·47 to ·79. In the four exceptions the correlation forming the denominator (of the expression used for finding a correlation with "g") is very close to zero, and this allows small variations to affect greatly the value obtained.

Consequently, it appears that we can conclude that Spearman's method should not be used where the correlations are very small, but that, if the basic correlations are not less than about ·20, and are not derived from abilities with overlapping specific factors, the correlations with "g" will not vary greatly.

However, the difference between a correlation of ·47 and ·79 is undesirably large, and this, together with other evidence from this analysis, gives strong warning that little reliance should be placed in factor correlations derived from a small number of tests, for besides chance fluctuation undetected overlap may be present.

The weaknesses of the Spearman methods as revealed by this analysis can be briefly stated as:

(1) The tetrad criterion sometimes fails to reveal overlap that does exist—or at other times it indicates overlap that does not exist.

(2) For the same test in different groups widely differing values may be obtained (see page 106, the four correlations for the Otis test).

(3) After the large amount of work involved one has no means of telling how far from the true value an obtained factor correlation may deviate, though the seriousness of this would appear to be reduced as the number of tests in a group and the size of the basic correlations are increased.

GENERAL IMPLICATIONS.

This analysis has served to emphasize that psychological tests need to be used with extreme discretion and interpreted with the greatest caution. Much light on their nature can be obtained from an analysis by the Spearman methods, but these methods need to be thoroughly investigated as otherwise interpretations as erroneous as from the tests themselves can easily be made.

RÉSUMÉ.

L'ANALYSE DE QUELQUES TESTS PAR LA MÉTHODE DES FACTEURS DE SPEARMAN.

La téchnique des facteurs de Spearman fut employée pour analyser sept tests américains quant à l'existence et la quantité de "g" et d'autres facteurs. Dans le cas de deux de ces tests, un test d'habileté méchanique et un test d'habileté de copisze, on analysa les sections des tests.

Les sujets étaient un groupe assez homogène d'étudiants américains d'université (âgés de 18 ans environ).

Les résultats obtenus indiquèrent les conclusions suivantes :

(1) Il existe une différence considérable entre les tests d'intelligence quant à leur pouvoir de mesurer "g," ou l'intelligence générale. Quelques-uns n'ont guère de valeur puisque le facteur spécifique est beaucoup plus grand que le facteur général.

(2) Les tests d'habileté méchanique et de copiste ne contenaient aucun facteur commun, sauf "g."

(3) Si un test d'habileté comprend plusiers sections contenant des facteurs différents il ne suffit pas d'additionner simplement les points de ces sections pour arriver à un résultat pour l'habileté en question.

(4) La téchnique de Spearman est insuffisante dans le cas d'habiletés ayant une corrélation basse (.20 ou moins), mais avec des corrélations plus élevées le résultat a une plus haute valeur.

ZUSAMMENFASSUNG.

ANALYSE EINIGER PSYCHOLOGISCHEN TESTS DURCH DIE SPEARMANSCHE FAKTORENMETHODE.

Man benutzte die Spearmansche Faktorenmethode, um sieben amerikanische psychologische Tests zu analysieren in Bezug auf Vorhandensein und Grösse von "g" und anderen Faktoren. Bei zwei dieser Tests- einem für mechanische Fähigkeit und einem für Schreibfähigkeit- wurde eine Analyse der Subtests gemacht.

Der Untersuchungsgegenstand war eine ziemlich gleichartige Gruppe amerikanischer Universitätsstudenten (von etwa 18 Jahren).

Die daraus gewonnenen Ergebnisse wiesen auf folgende Schlüsse hin :—

(1) Intelligenzprüfungen variieren sehr in der Ausdehnung, in der sie "g" oder allgemeine Intelligenz messen. Einige von ihnen haben fast keinen Wert, da der spezifische Faktor weit grösser ist als der allgemeine.

(2) Ausser "g" enthielten die Tests für mechanische und Schreibfähigkeit keinen gemeinsamen Faktor.

(3) Wenn ein Fähigkeitstest aus einer Anzahl von Subtests besteht, die verschiedene Faktoren enthalten, genügt es nicht, Noten bei diesen Subtests einfach zusammenzuzählen, um eine Rangschätzung in der Fähigkeit zu erzielen, die geprüft wurde.

(4) Die Spearmansche Methode genügt nicht für Fähigkeiten, die niedrige Interkorrelationen (,20 oder weniger), haben, aber bei höheren Korrelationen ist die Zuverlässigkeit grösser.

BOOK REVIEWS.

The Moral Judgment of the Child: By JEAN PIAGET. (The International Library of Psychology, Philosophy and Scientific Method. Kegan Paul, Trench, Trubner and Co., Ltd. Pp. 418. 10s. 6d.)

We heartily welcome a further volume from this indefatigable and eloquent writer. Having examined the child's conception of the world and of causality, Piaget now turns to enquire into the various stages of development of the child's ideas as to rules, law, justice, co-operation, punishment, and other general ideas involved in the development of moral judgment. His method of procedure in this enquiry is somewhat similar to that used in earlier researches. First, for example, he enquires into the children's ideas as to the rules of such games as marbles. Here he finds an ego-centric stage of play when the child, in play with others, does not try to win, and only at the age of seven or eight comes a stage in which there is " co-operation " shown by joining in the effort to win the game. From the age of six up to the age of nine or ten the rules of the game are thought sacred and untouchable and only at about eleven are rules recognized to be due to mutual consent and so changeable if generally wished. Something in the nature of a sense of obligation enters as soon as there is the beginning of a society, that is at least two individuals. Even at the ego-centric stage of games the child desires to play with others and like others, though he plays for his own sake only. The application of the term ego-centric here seems to the reviewer to be somewhat strong, as it did also in reference to some of the earlier types of thought and language discussed by Piaget in his previous books. Playing with others is obviously the beginning of some social life and the reviewer has noticed the liking of a child, at the age of four or five, to play with another not merely with a wish to enjoy her own game but with a view to showing a younger child how to play, though certainly not joining in a competition. To some extent therefore I should apply a somewhat similar criticism to Piaget's use of this term here that I did in an earlier review of his book on *Language and Thought in the Child* (in *The Forum of Education*, February, 1929). Piaget, indeed, sometimes seems to identify "social" with "co-operative," and if in reference to play he used the term " co-operative " instead of " social " it seems to me that his generalisations in this section of the book would be definitely less open to the criticism here suggested.

Later in the development of the child there comes a stage in which there is an effort to conform to rules and yet to win the game, and finally a stage, about the age of eleven or twelve, which is marked by an interest in the rules themselves. It should be interpolated at this stage that in this latest book Piaget definitely seems to modify the harshness of his division into stages of development which appeared in earlier volumes. For example, he points out that types of thought characteristic of the child appear in the adult; the truth seems to be that one type predominates over the other: it is a question of the proportion in which they are mixed. Further, he agrees that it is " arbitrary to attempt to cut mental reality up into stages " (p. 78). Indeed, near to the page from which we have just quoted Piaget himself points out that the social element is to be found everywhere from the earliest days of the child's life.

It is in the beginning of the impress of rules of behaviour from the outside that Piaget finds the origin of moral judgment and moral conduct—a point of view, of course, which is by no means novel. The first appearance of a sense of duty is due, as Piaget, following M. Bouvet, points out, to the reception of commands from older children and adults whom the child respects. Only later come a " sense of goodness " which is a " consciousness of something attractive and not merely obligatory " (p. 102) " a consciousness that is fully autonomous." Here Bouvet points out that contradictory commands from different persons lead to reflection.

Secondly, the sense of duty must be supplemented by the sense of goodness, if genuine moral development is to take place, for moral development involves " not only restraint and unilateral respect on the one hand, but also co-operation and mutual respect on the other " (p. 103). My own observations agree with Piaget's that spontaneous mutual affection may show its influence on conduct in the third year if not in the second year. It is indeed interesting to see sometimes that Piaget is placing various points of development at somewhat earlier stages than he did before, now that he seems to have been able to follow the development of his own little children as indicated in his Foreword. There also he makes the interesting observation that "a child's spontaneous remark is more valuable than all the questioning in the world."

To most English psychologists it would not seem to be necessary to have the elaborate argument, following Bouvet (p. 183 ff.) to show that moral rules are not due to an innate sense, but are inculcated by the child's seniors. Only a few philosophers and perhaps particularly theologians would, I imagine, maintain the latter position.

The latter section of the book deals with the topic of co-operation and the development of the idea of justice and fairness. The justification for hitting back, revenge, the avoidance of teasing and so forth are dealt with, as are also the fairness of different kinds of punishment for different situations. Up to the age of seven or eight "whatever conforms to the dictates of adult authority is just." Then occurs from eight to eleven a period defined by the progressive development of autonomy and the priority of equality over authority. In the domain of retributive justice, the idea of expiatory punishment is no longer accepted with the same docility as before, and the only punishments accepted as really legitimate are those based upon reciprocity (p. 315). At eleven or twelve a new attitude is said to emerge which indicates the beginning of relativity, a "taking into account of attenuating circumstances" (p. 316), an attitude which surely appears considerably earlier in some children.

In the last section of the book Piaget discusses acutely the relation of his findings to some sociological and ethical theories and concludes with a reference to their bearing upon some problems of moral education, and with an indication of an argument in favour of some degree of freedom and self-government. In this, however, he wisely points out that actual experiment in the schools is necessary and that conclusions cannot be drawn from the development of moral ideas in children to the best pedagogical methods of developing moral conduct.

A number of sections of the book could, with advantage be briefer in discussion; but the book as a whole is a very substantial addition to Piaget's former valuable contributions. C.W.V.

Social and Psychological Aspects of Primitive Education: By G. J. M. EVANS. (The Golden Vista Press, Fetter House, Fetter Lane, London, E.C.4. Pp. 90. Price not given.)

It could not be expected that such a short monograph as this would provide anything like a thorough treatment of such a big subject. Yet the book has a distinct value. The writer sets for herself the object of investigating the education of primitive races, noting the psychological aspects of these processes, and finally attempting to estimate the value of the education as exemplified in the adult. The authoress has obviously read very widely, not only in reference to primitive peoples but in general psychology, and the bibliography of works on primitive life is in itself very useful. On the other hand, the attempt to find material in the study of the activities of children among primitive people and their education which has a special significance for certain schools of psychological thought, such as the Gestalt psychology, behaviourism, psycho-analysis, and so forth, is not very successful. It is necessarily brief and scrappy, and it does not get down to fundamentals. The first section of the book, however, dealing largely with the play and other activities and the education of children among primitive people, is of genuine interest, and provides a most useful introduction to the subject. The topic of the last section was the hardest of all to treat satisfactorily (namely, the effect of primitive education on the character of the adult) because of the extreme difficulty of separating the consequences of different innate capacities and of educational influences, and here again the argument tends to be superficial. Nevertheless, the book is well worthy of study for those interested in this sideline of education and psychology, and we have no doubt it will be stimulate many readers to read more widely on the subject.

The Psychology of Laughter: by RALPH PIDDINGTON, M.A. (Figure-Head, 18, Adam Street, Adelphi, London, W.C.2. Pp. 227. 10s. 6d.)

This is a clearly written discussion of some of the most important views of the ever-puzzling problem of laughter, and an attempt to set forth a new theory of laughter as a definite means of social adaptation. The author touches but briefly on early stages of laughter and the relation between laughter and the play attitude. In the early stages he frankly confesses that one must accept a biological rather than a social interpretation, though some would object that the first should include the latter. His primary thesis is that laughter serves the function of a means of psychic compensation. It is " the response which expresses the suitable attitude for members of society to take towards ludicrous situations, " [illegible] being to prevent any disturbance of the system of social values *of which by individuals society depends for its existence."*

Mr. Piddington argues acutely for his theory but it seems to require a view as to the predominant " feeling " aspect of meaning, which seems invalid. No doubt, as he states, there is an affective element in all psychological meaning; yet surely many concepts which are important in our thought, and which frequently enter into laughable situations, are relatively lacking in strong affective aspects, though undoubtedly where affect is stronger and conflicting laughter may be still more prominent. The book concludes with a brief but useful account of the most important theories of laughter.

The Approach to the Parent: By Esther Heath. (Humphrey Milford. Oxford University Press. Pp. 163. 6s. 6d.)

This interesting book owes its appearance partly to the Commonwealth Fund. It is a conscientious and honest record of progress and difficulties in child-guidance work. The authoress has selected only four cases to be dealt with here, but they are described in great detail and therefore are the more interesting, although, of course, it is impossible to draw any general conclusion from the study of these few cases. The first case is particularly interesting as showing how the social worker criticizes her own attitude of eight years previous, moving more and more in the direction of trying to stimulate the children to take part in the real work of regeneration themselves. My impression in reference to this particular case, which is called " Taming the Savage," is that there was very little proof that the improvement was not simply due to growth, with the influence of new environment, and that the mother's affection increased as the youth improved, rather than *vice versa*, as is suggested by the author. Generally speaking, indeed, there seems to me a frequent tendency in records of child-guidance cases to under-estimate the difficulties inevitably due to innate and hereditary tendencies.

In view of the limitation of matter the book will be of more use to workers in child guidance clinics and students of child psychology than to parents, who may find no case here typical of their own children. C.W.V.

A Psychologist's Point of View: By CHARLES S. MYERS. (Heinemann. Pp. 207.)

The author describes this book as twelve semi-popular addresses on various subjects. About half of them have been published before, the rest appear for the first time in print. Although the chapters are semi-popular in the sense that they should be understandable by any intelligent and thoughtful reader, they are also valuable to the serious student of psychology as expressing the judgment of so mature a psychologist as Dr. Myers and that on some very important topics. Of special interest to readers of this journal will be the chapters on Principles of Development, Education and Vocation, the Freudian Psychology, and Instinct and Intelligence. Dr. Myers is as usual remarkably clear and very compact, so that in a brief space he surveys a wide field of knowledge. The book can be strongly recommended as supplementary general reading for the young student of psychology as well as for the general reader.

Psychology and Social Progress : By R. B. CATTELL. (London : The C. W. Daniel Co. Pp. 418. 15s. net.)

Dr. Cattell has written an imposing volume on an extremely important aspect of psychology. He has brought to bear upon his subject an extremely critical mind, and he has amassed a wealth of knowledge which he seeks to place at the disposal of his readers. This he does by writing in an easy persuasive style ; but he marshals his facts in an orderly way, and seldom loses sight of his objective. In successive chapters he discusses " The Quest for Certainty in Social Ideals " ; " Nation and Race " ; " Rich and Poor " ; " Ultimate Morality and Natural Science " ; " Progress and the Presence of God " ; " Man and Woman in Civilized Life " ; " False Beacons in Social Progress " ; " The Control of Destiny " ; " The Conquest of Obstruction ; Education " ; " A Tentative Plan for Constructive Racial Control." With such an array of topics the author has many excellent opportunities for advancing both destructive and constructive criticism ; he is in close touch with psychological research and his criticisms are, in general, based upon scientific principles. The book is frankly provocative and should be widely read. It would serve as a very acceptable text-book in Adult Educational Classes devoted to the study of social psychology ; the discussions would be long and furious.

Responsibility : *Its Development through Punishment and Reward* : By LAURENCE SEARS. (Columbia University Press. Pp. 198. 15s. 6d.)

We welcome this book in the first place because it attempts to discuss the borderline problems between ethics, the psychology of punishment, and the development of character ; and, secondly, because it does so in a wise and thoughtful manner. The first part deals with various theories of responsibility—utilitarian, evolutionary, idealist and so forth. The second part of the book begins the study of the development of responsibility in twelve children selected from a group of fifty on whom detailed reports were given by child-guidance clinics. The number is, of course, very small on which to base the third part of the book, namely, the evaluation of ethical theories in the light of the empirical data ; but the cases are used not as evidence but rather as illustrations for the discussion of various points of view as to punishment and responsibility. One conclusion as to responsibility is that " the all-important question is not whether a person is responsible but whether he accepts responsibilities."

The book is provocative of thought in a region by no means fully explored.

C.W.V.

The Human Personality : By LOUIS BERG. (London : Williams and Norgate. Pp. xv+321. 8s. 6d. net.)

Dr. Berg has written a popular account of the development of " The Human Personality " from the point of view of mental hygiene. He shows clearly the interacting influences, biological, environmental, sociological, and deals with many of the disintegrating agencies at work in personality. But popular presentations usually err by over-simplification. Dr. Berg has given us a volume thoroughly readable but not very scientific.

The Psychology of Effective Speaking : By PROFESSOR T. H. PEAR. (London : Kegan Paul. Pp. xiii+232. 6s. net.)

Professor Pear, who has already written so acceptably on " Voice and Personality," and who has interested himself in many of the psychological problems arising from broadcasting, has, in this volume, dealt with the difficult, but important, art of speaking. He is, as ever, stimulating and critical. He is always the genial critic and all who are interested in the subject will enjoy this book. But teachers, public speakers, ministers, lecturers and broadcasters might all, with profit to themselves (and to their auditors), carefully examine and measure their speech by the standards suggested by Professor Pear.

The Psychology of Sex: By HAVELOCK ELLIS. (William Heinemann, Ltd. Pp. 322.)

This "manual for students," as the author himself describes it, is a very welcome book, for the seven-volume edition of "Studies in the Psychology of Sex," by Havelock Ellis, is beyond the pockets and the time of many who are interested in a genuinely scientific treatment of the psychology of sex. No one is better fitted than Havelock Ellis to undertake this task, and this book, which is written primarily for medical practitioners and students of psychology, should be useful not only to these but to the general reader. The author in his preface explicitly states that he had chiefly in mind normal sex experience, though naturally in the course of his treatment he occupies a good deal of space with what may be regarded as sex-deviations if not abnormalities. Various chapters discuss the biology of sex, sex impulse in youth, homo-sexuality, and marriage, with a final discussion of the art of love and of sublimation. Havelock Ellis is always clear and balanced, and his wide knowledge inspires confidence.

The Psychology of Infancy: By VICTORIA HAZLITT. (Methuen and Co. Pp. 149. 5s.)

Dr. Victoria Hazlitt's tragic death brought a sense of deep loss to all who knew her and her work. This book only increases this sense. It has been edited from her papers, and in it we find the careful observations and temperance of statement which characterized her work. The book surveys the field of "Infant Psychology," including such topics as heredity, muscular control, habit, memory, thinking, and character. Of necessity the treatment is brief; but it is competent, and free from the imaginative interpretations of simple facts which characterizes many modern writings about early infancy. We are, if anything, more remote from the mental condition of a young baby than we are from that of a grown dog, and we must be grateful to this book for giving so plain and impartial a statement of our actual knowledge of this subject. M.S.

The Psychology of Literary Appreciation: By D. C. GRIFFITHS, M.A., M.Ed. (The Melbourne University Press. Pp. 142. 4s.)

The author has succeeded in presenting a stimulating account of current views on psychological problems in so far as they appear to help towards finding out the mental processes involved in reading and appreciating a poem or a book. He stresses the value of literature as releasing inhibitions "in the more or less subconscious desire-life of the appreciator through the symbolized adjustment of similar inhibitions in the artist," though other steps in the process of appreciation are not entirely neglected. His illustrations are varied and well chosen. His educational conclusions are such as are generally accepted by teachers of English in England.

A.E.C.

Intelligence and Intelligence Tests: By REX KNIGHT. (Methuen and Co., Ltd. Pp. 98. 2s. 6d.)

This monograph gives concisely an account of the development of interest in the nature and measurement of intelligence, with special reference to Professor Spearman's two-factor theory and his analysis of intelligence. The author then devotes a chapter to a critical examination of attempts to describe intelligence in physiological terms, holding that it is impossible so to describe it.

The remaining chapters are concerned with the nature and construction of intelligence tests, their uses, and some facts about the distribution and growth of intelligence revealed by the use of the tests.

The book forms an excellent introduction to the subject and should prove valuable to teachers, students of education, and others interested in the topic.

A.E.C.

Psychology and the Choice of a Career: By F. M. EARLE, M.Ed., D.Sc. (Methuen's Monographs on Philosophy and Psychology. Pp. 97. 2s. 6d. nett.)

This small book gives a superficial account of the aims and methods of vocational guidance, much of which has been said before and perhaps more lucidly.

To the educationist comments on the curricula of schools in relation to subsequent careers should prove of interest.

Biology in Education: Edited by J. G. CROWTHER. (Heinemann. 7s. 6d.)

This book consists of a report of a conference on " The Place of Biology in National Education," which was held under the auspices of the British Social Hygiene Council. The date of the conference is not given. Presumably it took place during the year 1933.

The subject matter falls into five sections, each with an editorial introduction. From a glance at the list of contents one would expect the subject of " Biology in Education " to be very comprehensively treated. Thus, the introduction of biology in schools of all types—public, secondary, preparatory, elementary, central, and technical—as well as in the training colleges, is dealt with in the various sections. The titles of the papers under these headings certainly raise high expectations on the part of the reader. It is possible that the abridgment has been carried out too drastically, but it is certain that the present reviewer experienced a sense of disappointment on reading the majority of the papers. There is much overlapping—perhaps that is natural—much that is platitudinous and wearisome, but undoubtedly a considerable number of useful suggestions are made.

All the speakers are convinced of the value of biology as a subject of education. Indeed, there is a tiresome reiteration of this fact, though the really cogent reasons for its inclusion in the curriculum are in no place set forth with sufficient emphasis. Perhaps the explanation of this is to be found in the fact that the audience was composed almost exclusively of the " converted."

Many of the contributors make ridiculously extravagant claims for the subject. For example, the possession of biological knowledge is said to be " the hallmark of culture." Again, " the hope for the future lies in the immense strides which biology is making." One contributor goes so far as to say that " if the pulpit ignores biology, sooner or later there will be empty pews " ! Another optimistically asserts that " we shall have a more moral nation as the people know more about biology." One gains the impression that biological knowledge is, in the view of these enthusiasts, the panacea for all ills, social and otherwise. Nineteenth-century ideas of progress evidently dominate the minds of some of the contributors, who appear to be unaware of the fact that the notion of continuous or inevitable progress is now seriously questioned. One is glad to observe that one speaker admitted that " it is a fundamental fallacy to assume that human conduct can be activated merely by factual knowledge. . . . The springs of human conduct must flow from something deeper than factual knowledge, even of biology." It is difficult to understand how any intelligent person could think otherwise.

In view of the very prevalent view that biology is synonymous with sex-instruction, one is relieved to find several speakers contradicting this. To make the reproductive function the pivot of the biological course results in a deplorably unbalanced study. Reproduction as one of the characteristics of all living organisms should be studied in its proper setting, without over-emphasis or isolation, just as respiration, nutrition, growth, and other manifestations of life.

While fully in agreement as to the desirability of biological instruction, the writer deplores the exaggeration which leads to the conception of man as exclusively a physical organism. Surely this is a most regrettable loss of values. Hence, one would like to have seen more evidence of awareness of this danger, and how to counteract it. The school and college studies in literature, history, religion, and art should all contribute to the restoration of a proper balance. This danger is a very real one, and is by no means confined to adolescent studies. Many expert biologists fall into the error of minimizing or overlooking the enormous gap which exists between man and the " higher " animals.

Three schemes of study are included in the appendix. Of these, the most helpful is the one devised by the late Sir J. A. Thomson for children of different ages. Professor Julian Huxley's scheme for children of 11-14 years is far too difficult and ambitious. I imagine few teachers with practical experience of children of this age would care to attempt the scheme in its entirety.

A useful bibliography is appended, containing books suitable for both teachers and pupils. E.M.P.

Language Learning: *Summary of a Report to the International Auxiliary Language Association in the United States (Incorporated).* (Pp. 59. $1.) Copies of the Report can be obtained from IALA, 415, Lexington Avenue, New York City.

" Incorporated " will ring strangely to many ears, but it should not be overlooked that the organisation has revealed valuable statistics to students of educational psychology. The experiments described were carried out by Dr. Laura Kenyon and supervised by Professor Thorndike. IALA has co-operated with Teachers' College, Columbia University. Praise is owing to Miss Helen S. Eaton for her summary, though when she expresses or quotes general views one is on occasion provoked to violent disagreement with her.

This is an objective report, not concerned with the idealistic aspects of an international tongue, but with the prognostic and propædeutic qualities of certain synthetic languages, and of Esperanto in particular, for the schools. The report, in fact, almost falls a victim to its objectivity: to mention Ido, Occidental, and Novial in the same line as Esperanto is for the specialist astonishing, and for the layman dangerous. It may be academic to question, but it is profitless to ignore numbers and a world-wide organization. Why should IALA modestly " not try to decide" what would be best for Japanese subjects? Surely IALA has read the pronouncements of the Japanese themselves in Geneva in favour of Esperanto. Further, was it wise to include the chapter on " Improvement of Auxiliary Language " with its many doubtful expressions of opinion, instead of leaving the extended and carefully carried out experiments to their own eloquence?

The report confirms statistically what is known haphazardly to the well-informed Esperanto speaking public. It should prove invaluable to both the psychologist and the practical teacher, as it throws rather a penetrating light on the many dark places in our system of language learning. The findings contained in the report—where no doubt exists, and it could be shown that in some respects IALA has erred on the side of understatement—ought to exercise a considerable influence on any curriculum directed by reason. A.T.

The University in a Changing World: a Symposium: Edited by WALTER M. KOTSCHING and ELINED PRYS. (Oxford University Press. Pp. 224. 7s. 6d.)

This book is prepared by the International Student Service with headquarters at Geneva. Chapters by different authorities deal with recent university development in France, Germany and Great Britain, Italy, Russia, and finally with the conception of a Catholic university. There is no attempt at exact delineation of treatment and the various authors have naturally stressed different aspects of the subject in their different countries. For example, the illuminating chapter on the university in Soviet Russia deals very considerably with the change in organization and the increase in the numbers of various types of students and so forth. Professor Ernest Barker, in his chapter on the universities of Great Britain, is very comprehensive considering his brevity. Dr. Flexner, in his brief essay on American Universities and Institutions of Learning, strikes the same note as in his recent book on the subject, and one rather gets the impression that the only place where really first-class research is being done in America must be in the Institute for Advanced Study in New York, of which Dr. Flexner is Director.

The book appears very appositely at this time when the whole function of the university is being discussed in its fundamental aspects.

An Experimental Study of Factors Influencing Consonance Judgments: By EUGENE GOWER BUGG. (Psychological Monographs, Vol. XLV, No. 2.) (Psychological Review Company, Princeton, N.J.)

This monograph is essentially an exposure of the conceptual chaos which has developed round the term "consonance," and also of the consequent confusion which has invalidated much of the experimentation based on consonance judgments. While originally two sounds heard simultaneously were judged to be in consonant relation if the effect were pleasing, the subsequent discovery that the tones of a consonant interval tended to be related in other ways has gradually complicated the concept of consonance, and led to its being regarded as something fixed and objective. Affective judgment has given place to cognitive judgment, scorable as "correct" or "incorrect." Unfortunately, however, there is no agreement as to what should constitute the criteria of judgment; further, the criteria usually employed, "blending," "fusion," "smoothness," and "purity," are not synonymous, nor do they apply equally to all consonances. This negatives the possibility of regarding consonance, even in these measurements of it, as a single definable concept. This work tends to accept as inevitable this state of confusion, and regards consonance as a complexity.

The main positive contribution made by this interesting study lies in its suggestions for further and more intensive research, for which the carefully tabulated results of Mr. Bugg's many and scientifically conducted experiments should provide invaluable help.

One cannot avoid the suggestion, however, that a more rigidly defined consonance is an essential preliminary to any further investigation of the factors involved in its judgment. J.M.

Principles of Health Education: By CLAIR ELSMERE TURNER, M.A., D.P.H. (D. C. Heath and Co.)

This book is a full exposition on the teaching of health education. A teacher with the necessary background of structural knowledge of the body will find the book a very able guide. In America, more time seems to be given to this subject—English schools being still far behind in the amount of time given in the curriculum. Special chapters on Curriculum Composition, Gradation of Material, and Methods of Class Instruction are particularly thorough and helpful, while the chapter on the Training of Teachers is of importance. In the foreword, Mr. Marshall says that the book "is not an expression of opinion, but the presentation of a carefully organized plan of experimentation in the only possible laboratory, a typical school system." As such, its use to all interested in the subject of hygiene or health education should be invaluable and stimulating. It is not a text-book of hygiene—there are many such to be procured—but a comprehensive outline of how such knowledge may be best given to school children. It should be in the hands of all who teach any branch of health education to children. M.E.H.

Success and Failure in the Teaching Profession: By GLADYS H. WATSON, (Department of Psychology, Teachers' College, Columbia University. Pp. 99.)

This is an interesting enquiry into certain characteristics (*a*) of students who were picked by their teachers at Columbia Teachers' College as being likely to be very distinguished in their career, and (*b*) of those students who were selected as being likely to be in the lowest 10 per cent from the point of view of professional success. All these students were subjected to a variety of tests. The authoress expressly disclaims any pretence of a thorough statistical enquiry. It is rather a preliminary study to test "some hypotheses which may warrant further statistical investigation. . . ." The co-operation of the students themselves was obtained for such tests as that for neurotic tendencies, and most of the students were persuaded to keep a diary in half-hour intervals for a week. As regards many of the items included in the various tests, little significant difference appeared between the two groups. One interesting difference, however, is that in certain "problem situations," as, for example, in school discipline, the superior group were less confident as to what the right response should be. Another is that the low group are much more conservative in their views on many matters than are the top group. The test for neurotic tendencies showed very little relation to probable professional success or failure. It is suggested that the presence or absence of mild neurotic traits does not at present affect professional success. Drive and energy and ambition for fame seemed to be a marked characteristic of the superior group. These differences, however, interesting and suggestive as they may be, are, as the authoress points out, taken from such a small group that they would need testing in a much wider field before much significance could be attached to them—and Mrs. Watson herself emphasizes the very great individual differences within the group. The whole report, however, is interesting and suggestive. C.W.V.

The Training of Teachers in England and Wales during the Nineteenth Century: By R. W. RICH. (Cambridge University Press. Pp. 286. 10s. 6d. net.)

Mr. Rich is to be congratulated upon having produced a book which deals fully with the subject of its title, keeps to the subject and manages to retain coherence even when describing events which moved rapidly and soon became more and more involved as during the past forty years. This is likely to be a standard work of reference for it is comprehensive and well-balanced. Where the author permits himself to be critical he has usually chosen safe ground, and an account which might easily be arid, though true, is relieved in many places by touches of humour. No doubt the author could have written more fully upon certain aspects of his topic, but he has done well to exercise the restraint which has kept him within the bounds of the present volume.

The detail of the book is suggested by the chapter headings. We have a few pages devoted to the Monitorial System, then many more to the transitional period, 1830-1840, up to the Battersea experiment. The development of the Training College system next receives attention, and it is followed by two chapters dealing with the period from the beginning of the P.T. system to the year 1860. The effect of the revised code shortly after this date is well brought out in the Work of the Training Colleges, 1860-1900. The Day Training College and the Pupil Teachers' Centre bring the Elementary Section to an end and Mr. Rich has a further chapter on the Training of Teachers for Secondary Schools. Individual chapters have their bibliographies, but there is also a general bibliography. A.P.B.

A History of Infant Education: By R. R. RUSK. (University of London Press. Pp. 194. 6s.)

Dr. Rusk's short history of infant education fills a place in the course of any student taking the history of education. It is well and clearly written, and gives an interesting idea of the chief people who have influenced infant schools. It is divided into two sections, Part I being concerned mainly with the writings of such men as Comenius, Rousseau, Froebel, and Dewey; and the second with the organization of schools from Oberlin to the present day.

On its own lines and within its own limits the book is very adequate. Its weakness it shares with most histories of education, for it gives very little information about what *actually* happened in schools at different periods. In no subject is the gap between theory and practice wider than in education, and an author who still charms us by the nobility and beauty of his thoughts on education lived and worked among school conditions which would to-day fill us with horror. The true history of education is to be found, and only be found with difficulty, in the log books of schools, the memoirs of pupils, or in the omissions of the codes of the Board of Education. In this book we obtain a few such glimpses. It would, perhaps, have been impossible, in a book of this size, to have given more. M.S.

Fluctuations in Human Output: By S. J. F. PHILPOTT, M.C., D.Sc. (Cambridge University Press. Monograph Supplements. Pp. viii+125. 12s. 6d.

Industrialists have long been familiar with facts of variability in output; probably every teacher of psychology has demonstrated the phenomenon of fluctuation of attention in the region of a limen, in some way or other, usually by auditory and visual tests, for example, Masson's disc, etc.

Dr. Philpott presents the results of researches which indicate the presence of some controlling factors in variability, but he prefers to reserve opinion as to their causes. Their effects are shown in a geometrical ratio, between the periods of occurrence of successive wave troughs in measures of production. He finds that work curves are periodic, compounded of elementary waves and having logarithmic periods which are whole-number multiples of some unknown unit of logarithmic time. The unit is claimed to be true of all the subjects tested under all conditions.

The establishment of these results is valuable in itself, although some objections might be raised on the validity of Dr. Philpott's conclusions; but it can be admitted that they raise important questions, as Dr. Philpott himself suggests, namely the apparent absence of individual, specific and phase differences, constancy in the unit of log wave length and geometricity. He has dealt with these questions in detail in Part II of the Monograph.

The thesis, which is highly technical, may itself throw light, or lead to light being thrown upon some of the aspects of "g," "s" and Co. The writer has concerned himself with a subject which seems to present new lines of departure at a great many points, and there is no doubt the matter has been very difficult to handle. At the same time, one could wish that the conclusions had been stated more explicitly.

A.P.B.

Club Leadership: By B. L. Q. HENRIQUES. (Oxford University Press. Pp. xiii+243. 3s. 6d. net.)

This book has arrived appropriately when so many seriously-minded people have turned their attention to the work to be done in clubs for young people. Although it is concerned with boys' clubs, there is yet much useful advice and benefit of experience as only such an one as Mr. Henriques can give, which will be of use to leaders of girls' clubs.

The book deserves a wide circulation. It is readable, straightforward, comprehensive in scope, and, above all, it is essentially practical in its outlook. In their ways all the chapters are valuable and no aspect of the work of a club leader has been omitted, but if one were to select one particular part of it the chapters on morality [illegible] spoken of with high approval; they are stimulating and will even [illegible] e numerous leaders and helpers whose peace of mind is disturb [illegible] and problems the modern youth brings before them.

A.P.B.

Science Teaching in Adult Education. (British Association for the Advancement of Science, Reprint N.S., No. 32. 6d.)

This is the report presented to the British Association at its Leicester meeting by a thoroughly representative committee appointed "to consider the position of Science Teaching in Adult Educational Classes, and to suggest possible means of promoting through them closer contact between Scientific Achievement and Social Development."

The report contains much valuable information gathered, in the main, from organizations responsible for Adult Education in different areas. Many suggestions are finally made regarding approaches, methods and schemes. The report will be very useful in helping to encourage the authorities to extend the facilities for Adult Education. The committee rightly emphasizes the essential differences that must be faced in science teaching in adult as compared with other branches of education. The crux of the whole matter is probably to be found in the development of a new technique in the teaching of science.

A Teacher's Problems: By A. C. PRICE, M.A. (Blackie and Son, Ltd. 3s. 6d.)

In this attractive readable little book by a retired head master, the author gives us some of the ideas and conclusions which he himself has "hammered out" from his own experience.

The class of teacher whom he addresses is rapidly decreasing—the young untrained graduate—but any young teacher does well to study carefully the experiences and opinions of a successful teacher who has thought out carefully the theory underlying his work, taking the advice of the author himself not to accept any advice without testing its validity.

Mr. Price uses such expressions as "training the mind," "training in the exercise of judgment," and indeed is guilty of the fallacy so often underlying their use. A case in point, and incidentally, this occurs in the chapter headed "Popular Misconceptions," is when he implies (page 132) that the value of a training in classics was shown when a pupil of his who went up to Oxford with a classical exhibition took his degree with a first class in science, of which he had learnt little at school.

One of the best chapters in the book is perhaps that on the teaching of divinity, a subject too often evaded, ignored or inadequately treated by teachers in school and in books on method. The spirit which pervades the whole book makes it easy to understand why old boys would appeal to the author for advice and guidance not only in the choice of a career, but in the pursuit of it. F.M.A.

How to Teach: By BENJAMIN DUMVILLE. (1933. U.T.P.)

Sound sense derived from a mixture of theory and practice is one of the author's aims. Any reader desirous of help in practical matters of school-life will undoubtedly find much sound sense in this book, and in trying out the author's solutions be better able to find answers to his own personal problems of general organization of his classes and relations with his pupils.

The author draws largely on his own long experience and uses it to advantage to explain and illustrate the views he puts forward. He also makes much use of quotations. Occasionally he allows these to obscure the statement of his own views. A case in point arises on pp. 49-50, where he introduces the highly controversial (some would say ridiculous) generalization that women teachers are the cause of the increase of youthful crime, and apparently allows the views of one Sunday newspaper and one London head mistress to settle the question so far as he is concerned, with, it is true, some faint praise of women teachers to soften the blow.

This little book "How to Teach" is a fitting companion to the author's larger "Teaching: Its Nature and Varieties." F.M.A.

Play Production for Amateurs and Schools: By JEFFREYS AND STOPFORD. (Methuen and Co., Ltd., London. 7s. 6d.).

This book was submitted to a former leading lady, who agreed that it is technically perfect. The suggestions for the producer, rehearsals, settings, stage, lighting, scenery, costume, make-up, and choice of plays are admirable. Particularly the photographs of settings are a delight. Prices of every conceivable piece of property, specimen Producers' Copies, and an exhaustive bibliography are given. The drawbacks of the book are that it will prove useful only to the very advanced amateur dramatic society with semi-professional knowledge and exceptional stage equipment. The number of schools which might profit could be counted on the fingers of one hand. Furthermore, too many references are given. This may be splendidly academic, but is in strange contrast to the simple title. A.T.

Memorandum on the Teaching of English: By THE ENGLISH PANEL OF THE ASSOCIATION OF ASSISTANT MISTRESSES IN SECONDARY SCHOOLS. (The University of London Press. Pp. 71. 2s.)

This memorandum claims that the study of English language and literature must supply the discipline formerly given by classical studies to thought and speech together. A brief survey of the present position in the different branches of the subject is given, and some practical suggestions are made.

The Heart of the Bible: By JEANNIE B. THOMSON DAVIES, M.A. In three volumes. (George Allen and Unwin, Ltd. Pp., vol. i, 280; vol. ii, 256. 5s. each.)

This is an attempt to give in three volumes selections from the Old Testament arranged in order of their own appearance rather than of the supposed date of the events described, together with connecting material provided by the authoress, indicating something about the sources of the literature [illegible] of the events described, a discussion of their historicity, an [illegible] Jewish customs, and so forth. As it implies a method of teachi [illegible] view is justified in this journal and certainly the authoress deserves to be congratulated upon the result of her venture. No attempt at an estimate of the accuracy of Biblical scholarship revealed by the book can be attempted here, but Miss Davies's treatment is fresh and interesting, her selection of material seems admirable, and this presentation of the great passages of the Old Testament in a new form should encourage its study even if primarily as great literature. The book is naturally not suitable for junior but rather for senior scholars and teachers.

The Northamptonshire Composition Scale: By G. PERRIE WILLIAMS. (G. G. Harrap and Co., Ltd. Pp. 129. 5s. net.)

The author describes experimental work carried out with the co-operation of Northamptonshire teachers with the aim of fixing a scale based on the median judgment of a group of examiners, and of preparing a series of compositions graded according to the scale. The children, whose compositions were marked, were about 11 years of age. The scale should prove of interest to those who believe that written compositions should form an important element in the testing of 11-year-olds; the description of the method used in preparing the scale should prove valuable to those who wish to prepare an English Composition Scale for the assessing of the work of older pupils. A.E.C.

An Experimental Investigation of Eye Movements in Learning to Spell Words: By LUTHER C. GILBERT. (Psychological Review Co. Pp. viii+81.)

This account of a number of experiments on good and bad spellers of different ages, using photographical records of a beam of light reflected to the cornea of one eye, shows that poor spellers have not acquired effective methods of word analysis and that good spellers do not waste time on detailed analysis of recognized letter groups, and concentrate attention on the difficult spots.

The investigation supports the view that learning to spell is an individual activity, and that individual guidance is necessary in word analysis, as words easy for one individual may be difficult for another. A.E.C.

Australian Educational Studies. First Series. (The Melbourne University Press. Pp. 125. 5s.)

This volume contains accounts of (1) an investigation into the length of the teacher's professional life in five of the Australian States; (2) an experiment in the teaching of reading comprehension; (3) a preliminary investigation on standardized tests of teaching ability; (4) problem children in Melbourne schools; (5) crippled children in Tasmania; and (6) an Australian nursery school.

1932 *Mental Survey Test*. (University of London Press, Ltd. Pp. 8. 4d.) Specimen Set with Preliminary Practice Test and Instructions for Administration, 9d.

This provides in a very convenient form the mental tests which were prepared for the Scottish Council for Research in Education.

Teaching: Its Nature and Varieties: By BENJAMIN DUMVILLE. (Third Edition. 1933. U.T.P.)

This is a new and third edition of Mr. Dumville's well-known book. In the Second Edition a chapter was added dealing with such recent developments in individual teaching as the Dalton Plan and the Montessori Method. In the Third Edition no important alterations have been made in the old text, but a new chapter has been added to bring it up to date. This chapter deals mainly with the further results of the testing of the new methods for individual work, and gives also a brief account of such developments as the gramophone, broadcasting, and the cinematograph.

Comparative Education: By I. L. KANDEL. (George G. Harrap and Co., Ltd. Pp. xxvi+922. 12s. 6d.)

Dr. Kandel takes England, France, Germany, Italy, Russia, and the United States and discusses their national systems of education in the light of the political, social and cultural forces which determine their respective characters. The book affords good reading and should find a place in all libraries of comparative education. There is a valuable bibliography and the price is very moderate for so large a book.

America in School and College: By WILLIAM BOYD. (The Educational Institute of Scotland. Pp. xiii+240+iii. 3s. 6d.)

This is an entertaining and instructive outcome of Dr. Boyd's journey to the United States as Visiting Professor of Education in Teachers College, Columbia University and Ohio State University in 1930-31. Not the least interesting side of the book for some readers will be the glimpses it affords of education in Scotland. There is a chapter on Canadian Education and a list of books which the author has found of special value for understanding American education.

The Primary School Curriculum in Australia: Edited by PERCIVAL R. COLE. (Melbourne University Press in association with Oxford University Press. Pp. xiv+310. 10s.)

The work of a committee of prominent Australian educationists appointed by the Australian Council for Educational Research, this book is not only a valuable addition to the library of comparative education, but also a discussion of matters of general application relating to the curriculum.

A History of the Teaching of Domestic Subjects: By HELEN SILLITOE. (Methuen and Co., Ltd. Pp. xxi+245. 7s. 6d.)

Other historians of education will be glad that the Association of Teachers of Domestic Subjects "is desirous that its members should take stock of their profession" since this book is the outcome of that desire.

VOLUME IV. JUNE, 1934. PART 2.

THE RELATION BETWEEN DEFECTIVE SPEECH AND DISABILITY IN SPELLING.

BY FRED J. SCHONELL
(Goldsmiths' College, University of London).

Introduction.
I.—*Material and methods.*
II.—*Speech defects amongst backward spellers.*
III.—*Backward spellers with organic speech defects: case study.*
IV.—*Functional speech defects and disability in spelling.*
V.—*Backward spellers with functional speech defects: case study.*
VI.—*Stammering and spelling ability.*
VII.—*Faulty pronunciation and spelling ability.*
VIII.—*Summary of conclusions.*

INTRODUCTION.

SEVERAL sections of the research reported in the following pages were undertaken during an investigation into disability in spelling amongst London elementary school children.* The sections referred to are those dealing with the incidence and severity of functional and organic speech defects amongst backward spellers, vital points which naturally claimed inclusion as an integral part of a study on disability in spelling. During the course of the investigation there also arose two allied, but not so fundamentally important, problems, firstly, "How far is there a relation between inaccurate spelling and mispronunciation?" and, secondly, "What influence has stammering on spelling ability?" Little information existed on these problems, hence towards the close of the major investigation they were considered in some detail. The combined results obtained from the various sources provide clear and comprehensive knowledge of an experimental nature on the entire question of defective speech and disability in spelling.

I.—MATERIAL AND METHODS.

study of 105 cases of specific spelling disability representative of a school population of 7,000 children. No pupil was included in the research unless he had an I.Q. of 86 or more and was working up to class standard in all subjects except spelling (or reading and spelling—some degree of disability in the two was found in 91·2 per cent of the cases), in which subject he had to be at least a year below the average attainment of the class in which he was placed. The examination of each case involved the application of intelligence tests, a variety of spelling and reading tests, tests in arithmetic, composition, drawing, and writing, fourteen standardized psychological tests, sensory tests, and, in addition, the gathering of information by means of a personal and family history sheet, a spelling and reading history sheet, personal interviews, informal and compiled questions, and a trait rating scale.

II.—SPEECH DEFECTS AMONGST BACKWARD SPELLERS.

The speech defects considered were organic and intense functional paraphemia, dysphemia (stammering), and habitual thick speech (lalling, lisping, and inability to pronounce certain consonants). Misspelling, due in part to slovenly pronunciation, such as an undue nasalization of vowels and slurring and clipping of words, is discussed at the end of the study.

The first fact which manifests itself to one who investigates problems dealing with speech defects is that an extremely small proportion of the cases is due to malformation, that is, injury or variation in structure of the lips, tongue, hard or soft palate, or the pharyngeal or buccal cavities. Very few cases had harelip, teeth out of line, palatal deformities, or were tongue-tied.

Table I shows the percentage of organic and functional defects found amongst the 105 backward spellers and amongst a comparable control group of normal spellers.

TABLE I.

PERCENTAGE OF SPEECH DEFECTS AMONGST BACKWARD AND NORMAL SPELLERS.

	Backward Spellers.			*Normal Spellers.*		
Speech Defects.	*Boys.*	*Girls.*	*Average.*	*Boys.*	*Girls.*	*Average.*
Organic............	1·8	—	·9	—	—	—
Slight Functional ..	—	2·0	1·0	3·4	1·8	2·6
Intense Functional..	7·3	—	3·8	—	—	—

III.—BACKWARD SPELLERS WITH ORGANIC SPEECH DEFECTS.

Amongst the backward spellers there were only two children, a boy aged 12 years 1 month (I.Q. 87), and a girl aged 10 years 1 month (I.Q. 96), whose disability in spelling could be attributed, to some extent, to an organic speech trouble. The former had a palatal deformity which caused him to distort certain consonants while the latter had been a case of organic defect but was now one of functional disability. Her case is of extreme interest. Enquiries into personal history revealed that Doris talked at a normal age but that her walking was delayed until the age of four owing to rickets. This, together with measles, mumps, chicken pox, and whooping cough, all within a few years, affected physical development so that she is now quite under-sized. Her early rachitic condition also manifested itself in an almost complete loss of her first teeth at the age of five. This seriously handicapped her speech and as the phonic method of teaching reading was used in the infants' department she experienced difficulty in making the sounds. As a result of this and her general physical condition she became reticent about reading aloud or conversing with others.

Her health during the past three years has been normal and school attendance regular. Home conditions are good. She has two sisters and one brother; the sisters displayed average verbal attainments for their ages, but the brother was slightly backward in spelling.

In temperament Doris is shy and reserved, even cold in demeanour towards others, so that class teachers have found it almost impossible to get into rapport with the child. She says very few words in reply to questions asked her. Her uncommunicative attitude is not due to sulkiness or antagonism but to a distinct inferiority complex with regard to speech. When she does express herself the words are uttered in a slurred, hesitant manner, very little use being made of the lips, tongue, and teeth. Frequently only the first part of the word is said as in "mard" for "married" and "yessa" for "yesterday."

In the Binet Simon Examination (London Revision) her mental age was 9 years 8 months (I.Q. 96). Extreme tact was needed to get a measure of her latent capabilities. In the Binet reading test which occupied one minute (normal time for average 9-year-old being 40 secs.) she could not recognize four words and only reproduced two items. She failed in defining terms superior to use, discrimination of weights, visual drawing, and in giving sixty words in three minutes (gave only forty-eight). On the other hand, she easily repeated seven digits and showed good reasoning ability.

With a non-language intelligence test (Otis) her mental age was 10 years (I.Q. 100). Her mental ages in the various standardized educational tests* are as follows:

ARITHMETIC .... Mechanical, 9·8; Mental, 9·5; Problem, 9·4.

She is extremely interested in arithmetic lessons, which she enjoys better than any others. She gets a certain amount of silent joy from manipulating figures, no doubt entranced by the fact that a minimum use of words is required. She occupies fourth place in arithmetic in her class.

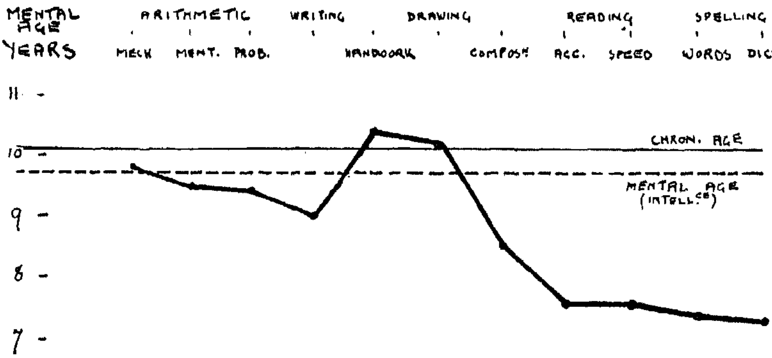
COMPOSITION .. Quality, 8·5; Quantity, 8·5; Spelling Errors, 27.

Ability in this subject, the test of which was a half-hour's theme on "School," is somewhat below general mental level.

WRITING, 9·0; DRAWING, 10·1; NEEDLEWORK, 10·4.

In the last two subjects she is one of the best pupils in her class, her needlework is extremely neat and skilful.

The psychograph reproduced below gives a clear contrast in a diagrammatic form of her poor verbal ability on the one hand and her much superior arithmetical and artistic abilities on the other.



PSYCHOGRAPH OF EDUCATIONAL ATTAINMENTS.

DORIS C.

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* The standardized educational tests were those found in *Mental and Scholastic Tests*, by CYRIL BURT. See pages 339-398.

Tests of visual and auditory acuity gave the following results:

SIGHT (Snellen's Charts)	Right Eye, 6/9; Left Eye, 6/9. No evidence of astigmatism.
HEARING	No defect in whisper test. On the contrary, she shows to advantage in it possibly because the test involves digits, a medium in which she works and expresses herself best.

Her mental ages on a battery of related psychological tests (previously standardized on 600 London children attending schools in the area where the investigation was being conducted) were as follows:

MEMORY	Logical Immediate	7·5
	Logical Delayed	7·5
	For words Visual	6·5
	For words Auditory	6·5
	For digits Visual	9·0
	For digits Auditory	11·0
	Mechanical Visual	6·5
	For forms Visual	9·8
PERCEPTION DIFFERENCES IN PRINTED PAIRS OF WORDS (Visual)		9·2
CANCELLATION TEST (Errors)		6·9
WORD BUILDING		8·5
ASSOCIATION (of Signs with Letters)		8·5
VOCABULARY		8·9
AUDITORY DISCRIMINATION (of words similar in sound—e.g., tied, tired)		6·8

An examination of her psychological test scores reveals a definite weakness in the simplest of verbal material, both visually and auditorily presented but more pronounced in the latter form. In memory for concrete nouns of *three letters*, e.g., cat, bun, hip (auditory presentation), she reproduced only twenty out of the thirty-two words, seventeen of these (85 per cent) had " a " for the vowel but " a " appears in only 40 per cent of the words in the correct list. Furthermore, the unevenness of her scores are symptomatic of a child whose general efforts are hampered by temperamental complications.

Her achievements, in mental ages, in the reading and spelling tests are as follows:

GRADED READING VOCABULARY	7·6
MONOSYLLABLES (Speed)	7·6
GRADED SPELLING VOCABULARY	7·4
GRADED DICTATION*	7·3
RECOGNITION SPELLING	7·0

The amount of her retardation varies from 2·4 mental years in reading to 3·0 mental years in recognition spelling. Her spelling errors are mainly of an auditory-articulatory nature, with a tendency to replace words of which she is uncertain by known words of similar sound, thus the prose :

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* F. J. SCHONELL: *Essentials in Teaching and Testing Spelling*, pp. 22-31. (Macmillan, 1932) for the Graded Dictation Tests used in Case Studies.

" I saw her run by in the wet,
She came to seek or steal a bird's nest in the grass—the cruel little kitten."

is reproduced as :

" I saw her run *my* in the *rat,*
She came to *sook for seal* a *bards nesd* in the *glass*—the *care* little *caton.*

The most noticeable and diagnostic feature about her spelling errors is that her defect in power of auditory discrimination of phonetic values is greatly influenced and accentuated by her articulatory weakness.

The easiest vowel to pronounce, " a," is substituted, in many words, for vowels " o " and " u " which require a maximum of lip movement. For example :

" Write and read " is written as " rate and rard."
" Pieces of poetry " is written as " pacea of patrei."
" Straight pipes " is written as " sate papes."

Labials suffer most so that such a phrase as " the marble statue " is said and written as " the moma sacea."

The foregoing evidence indicates conclusively that Doris' disability in spelling, and, to a lesser extent in reading, is due to a weakness in auditory discrimination, accentuated by the present articulatory weakness and accompanying emotional inhibition in the field of spoken and written language. There seems to be little doubt, too, that her present condition had its origin in her unfortunate experiences at the age of five, when the loss of her teeth and consequent inability to make even approximately correct representations of the various " sounds " robbed her of both confidence and the assistance of a correct articulatory-auditory foundation in learning to read and to spell. For it must be remembered that most young children when learning to read and spell set up articulatory-auditory units, so that actual saying (either with or without sounds) of the syllables of the words aid in recognizing or in spelling them as the case may be. Doris, as a result of her early defect, had not formed any very strong bonds between the visual symbols and the corresponding auditory values of the linguistic forms.

The following enumeration of the methods of remedial work adopted will, perhaps, be of value :

(*a*) Teaching the child to speak correctly, that is, to make full use of lips, tongue, and teeth. This was accomplished by the use of amusing speech training exercises, learning short poems, and through the co-operation of the parents in the daily conversation of the child.

(*b*) Assisting Doris to discriminate more easily differences in variation of vowels and the nature of consonantal digraphs by extensive drills with word families.

(*c*) Composing simple rhymes and jingles.

(*d*) Supplementary reading aloud from illustrated books (previously she had shunned the printed word and had never opened a book at home) ; in this the elder sisters gave valuable help.

(*e*) Short but frequent spelling lessons with common words—trial recall and kinæsthetic aids being used extensively.

(*f*) Attempts to remove inhibitions set up by past failure in verbal subjects, strengthening the self-assertive side of her nature through games and activity work, encouraging her to express herself more freely by use of lecturettes, recitations, and dramatics, and, finally, lavish praise from her teachers.

There was marked improvement in reading mainly through the interest in supplementary work, so that progress of 1·5 mental years in six months was registered. In spelling, vowel confusion diminished and a gain of 1·1 mental years was made.

IV.—FUNCTIONAL SPEECH DEFECTS AND DISABILITY IN SPELLING.

Turning now to functional speech defects we find that paraphemia is the condition which most affects attainments in reading and spelling. In the current investigation it proved to be a major causal factor in the disability of no less than four pupils, all of whom were boys.

Functional paraphemia, which is due to a lowered power of auditory discrimination in the realm of speech, manifests itself in varying degrees of intensity. Its most extreme forms have been studied in detail by Fildes* and Ewing†. Some of Miss Fildes' cases were almost deaf to speech and unable to converse ; in fact, their state so much resembled mental deficiency that several of them had been committed to special schools for the mentally defective. Of their verbal powers the investigator says : "... comprehension of spoken language is for all practical purposes negligible, for in their cases the speech was quite incomprehensible, commonly being carried on mainly by gesture."

The four examples of paraphemia encountered during this investigation were of a much less serious nature than those referred to above, for although their speech was defective they could hear and understand spoken words perfectly, had a good vocabulary, and could (except for one to whom I shall allude in a later paragraph) converse freely and intelligently provided one listened very carefully to their inarticulate jargon. Their defect, a psychological and not a physical one, showed itself in their inability to discriminate between similar phonic elements such as "sh" and "ch," "f" and "th," "s" and "sh," so that their speech and written work was characterized by numerous substitutions for and distortions of vowels and consonantal digraphs which they were unable to master.

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* FILDES, L. A. : *A Psychological Enquiry into the Nature of the Condition known as Congenital Word Blindness.*—Ph.D. Thesis in the University of London Library.

† EWING, A. W. : *Aphasia in Children.*—Oxford University Press, 1930.

V.—BACKWARD SPELLERS WITH FUNCTIONAL SPEECH DEFECTS.

Of the cases under discussion two came from good homes and two from very poor homes, but all were alike in that their verbal attainments were extremely meagre. The two former were George F., aged 10 years 6 months (I.Q. 90); reading age, 6 years; spelling age, 6 years six months; composition age, 6 years 5 months; and Douglas C., aged 8 years six months (I.Q. 94), whose defect was of a much less pronounced character than that of the other three boys: reading age, 5 years 6 months; spelling age, 5 years 9 months; and composition age, 6 years. Of the others, one was Albert B., age 8 years 2 months (I.Q. 90), who could only read and spell a few monosyllables: reading age, 5 years 2 months; spelling age, 5 years 1 month. In this case there was additional to the paraphemia, a strong emotional inhibition which very greatly handicapped the boy in his endeavour to express his thoughts in words. So pronounced was the agitated state during conversational contact with many adults, including some members of his own family, and children with whom he was not familiar, that attempts to speak were accompanied by physical tension and perspiration. His intermittent emotional state had resulted largely from unhealthy home influences—the mother maintained that the boy could speak properly if he tried, he was only lazy and wanted it "knocking out of him," which alleged remedy she not infrequently applied, while the father still further confused and depressed the unfortunate boy by avowing that the speech defect had become much worse since Albert had been operated on for tonsil and adenoid conditions.

The remaining case, Len E., aged 9 years 1 month (I.Q. 90) was by far the most interesting of the group. Information on family history revealed some significant facts. The father was a bricklayer's labourer who, judged by speech, appearance, and general behaviour, was subnormal. Until 14 years of age he could speak only Welsh, and even now his speech is poor and difficult to follow. An adrenal type, displaying more characteristics of the adrenal insufficient than the adrenal adequate, he was thick set in appearance, boorish in nature, and unemotional in temperament.

The mother was English, slight, and fair in appearance. Her speech was almost refined, grammatically accurate, and cultured in pronunciation and accent. Her letters to the head master showed that she could write equally as well as she could speak ; they exhibited an accuracy of structure and a correctness of spelling which were superior to others of the same social status. Highly emotional, neurotic in temperament, she was given to brooding and worry. Some time ago she spent two short periods in a mental home. Amongst the relatives on the mother's side there was plain evidence of intelligence and social attainments above average. Her father was a master builder, while a cousin was a draughtsman. There were four children in the family, three boys and one girl. One boy, now aged 15, who went to the same school, suffered from a speech defect similar in nature but not as intense as that now afflicting his brother. Between the ages of 11 and 12 his speech began to improve steadily so that by the time he left school he spoke almost normally. The girl, who is now 22, also suffered from a functional speech impediment until she was 10 years of age. On account of chorea and a low standard of health she had been sent to a home for nine months, and when she returned to her family the speech defect had almost disappeared.

Len, the present case, had not been entirely free from illness. At 3 and 4 years of age he had scarlet fever and diphtheria respectively, while at 7½ he had slight congestion of the lungs. He had lately been receiving treatment for rheumatic trouble, due, probably, to a combination of post diphtheric disturbance and general nervous instability. He displayed in class room and while one was speaking to him reflex or habit spasms, screwing up his face and at times raising his right shoulder. It would seem, then, that Len's speech defect was the outcome of a number of different inherited factors, the most apparent of which, to the lay observer, were, on the father's side, subnormality, difficulty in mastery of English, and present poor speech, and on the mother's side emotional instability and neurotic tendencies.

The boy himself was a likeable lad, diffident at first about entering into conversation, but once this had passed only too eager to talk with anyone who would take the trouble to understand what he said. He read correctly fifteen monosyllabic words (i.e., reading age 5 years 5 months), and wrote correctly ten words of a graded spelling test (i.e., spelling age 6 years). His attainments in arithmetic were quite on a level with those of normal children of the class in which he was placed. His general knowledge and vocabulary were superior to some children of the same age and social grade. The extreme nature of his retardation in written English is to be seen in his composition on " school " :

> " The voxhe scrs wie gro sue and wie gro viin and we gro ruin and we gro groin. Sue fo uo gin the sci, the du 5. Wie go in the vor and wie cin we oio and uci wie go ba rin cothe and co ba. Cuco wie sdand in the all and one of the sithe cu the cvi no the dovo, the du the is of theco."
>
> (The Forster School we do sums and we do writing and we do drawing. Some us get the stick, about 5. We go in the hall, we sing, we pray, and next we go back in the classroom and go back. Sometimes we stand in the hall, and one of the teachers tells the story out of the Bible—the story of the Israelites.)

The execution of this strange literary effort occupied a full half-hour and involved an immense amount of strain on the boy. He indulged in innumerable and varied twistings and turnings of the tongue and lips in an endeavour to translate his ideas into written words, through the medium of their sound values. Just how distorted these articulatory movements were and how distorted the auditory elements were which he thus called up, can, to some extent, be gauged from the strangeness of his orthography. It was not due to a paucity of ideas that he wrote so little, for in oral composition he expressed himself quite freely, but to the intense emotional inhibition that entered when he tried to change his thoughts into written language. The feeling of helplessness resulting from the ineffectiveness of his articulatory motor movements had been accentuated by the means employed in trying to teach him to read and spell, namely, a phonic method which laid stress on articulatory-auditory analysis of words.

Subsequent remedial work showed that the sounds with which he most frequently experienced difficulty were those of :

c made as " she " or " ch."
s ,, " ch."
v ,, " vree."
l ,, " ull."
z ,, " ched."
m ,, " n " (lips not closed).
t ,, " k."
j, g, and d were all confused with one another.

Thus he would say baschet (basket), chining (shining), kerries (cherries), graw (draw). His linguistic retardation was not only due to the above habitual speech errors, but to confusion in writing some letters, for example : b, p ; l, i ; p, d ; v, y ; were sources of uncertainty. Remedial teaching was carried out with him for some time, and a certain amount of progress was achieved through visual and tactile methods in writing and imitative exercises in speech. It would, however, have been the work of an investigator for a year or more to bring him to normal standard in written and spoken English.

The extreme verbal retardation of all these cases very forcibly demonstrates one point, namely, the importance of the articulatory-auditory process in learning to spell and to read. If either through organic defects in the necessary organs or through an initial weakness in discrimination of similar "letter sounds" (which unless there is extra training of a systematic type leads to fixation of faulty speech habits) children are unable to speak correctly they labour under a handicap which in acquirement of skill in reading and spelling is often greater than that occasioned by defective vision.

VI.—STAMMERING AND SPELLING ABILITY.

Not every speech defect though need cause spelling disability, for it is necessary to distinguish between those cases in which the child's articulation is always faulty and those in which it is only faulty on specific occasions. This is seen in a consideration of the varied spelling achievements of stammerers. With a view to obtaining evidence on this point estimates of intelligence and spelling ability were obtained for a number of children who suffered from stammering. This group consisted of twenty-five boys and twenty-four girls. A number of the children had been attending stammering classes. Tables II (Boys) and III (Girls) show the results obtained from stammerers and comparable control groups of non-stammerers.

TABLE II.

CHRONOLOGICAL, MENTAL, AND SPELLING AGES OF STAMMERERS AND NON-STAMMERERS (BOYS).

Item.	*Stammerers* (25).		*Non-Stammerers* (30).		*Standard Error Diff. Means.*	*Reliability D.*
	Average.	*S.D.*	*Average.*	*S.D.*		*S.E. Diff.*
Chronological Age ..	11·5	1·40	11·5	1·41	—	—
Mental Age	10·8	1·25	11·0	1·30	—	—
Spelling Age	10·4	1·42	10·8	1·43	·385	1·04

Least Pronounced Cases :
C.A. 8 years 5 months .... M.A., 10·5 ; S.A., 10·7.
C.A. 13 years 7 months .... M.A., 14·0 ; S.A., 15·0.
Most Pronounced Case :
C.A. 12 years 4 months .... M.A., 11·0 ; S.A., 9·2.

TABLE III.

CHRONOLOGICAL, MENTAL, AND SPELLING AGES OF STAMMERERS AND NON-STAMMERERS (GIRLS).

Item.	*Stammerers* (24).		*Non-Stammerers* (30).		*Standard Error Diff. Means.*	*Reliability D.*
	Average.	*S.D.*	*Average.*	*S.D.*		*S.E. Diff.*
Chronological Age ..	11·6	1·2	11·6	1·30	—	—
Mental Age	10·6	1·46	10·9	1·36	—	—
Spelling Age	10·0	1·38	10·6	1·45	·385	1·56

Least Pronounced Case :
C.A. 10 years 8 months .... M.A., 11·6 ; S.A., 12·5.
Most Pronounced Case :
C.A. 12 years 3 months .... M.A., 11·6 ; S.A., 9·6.

The figures show that in Table II (Boys) the difference is just significant, while in Table III (Girls) it is definitely so. Further evidence of the exact nature and extent of the influence of stammering upon spelling ability is, however, necessary, for there are in each group of stammerers 35-40 per cent whose spelling age is either equivalent to or slightly higher than their mental age. That is there are over half as many on whom this particular speech defect has absolutely no influence as there are those upon whom it has a possible influence. In what circumstances then does stammering have a detrimental effect upon attainment of orthographic accuracy? The question is best answered by a consideration of the nature of stammering and a careful examination of cases in which it is the apparent cause of retardation.

In the first place, stammering is a condition having its origin in nervous and emotional instability and operating mostly in social situations. Many stammerers are able to talk normally when speaking in unison with a number of individuals. They can, too, take part in the imultaneous recitation of spellings, tables, or poetry. Moreover, most of hem can carry out perfect articulatory movements when they wish to use that means of recalling the spelling of words. They are quite different rom the four paraphemic children previously discussed, in which case here was a constant deprivation of articulatory aids in a large number f letter combinations. In powers of imagery, too, the stammerer does ot appear to be inferior to the normal speaker. The results of Robins'* xperimental work in imagery, with stammerers and non-stammerers, provide evidence on this point. He used as his material lists of words and nonsense syllables in which he made changes in short vowels, long vowels, and consonants. These changes had to be detected in one set of words by visual, a second set by auditory, and in a third set by kinæsthetic (articulatory-motor) means. In the whole series the average scores for stammerers and for those without an impediment were practically identical, the only important differences being that the former group failed to detect long vowel changes quite as readily as the latter, and that they paid more attention to consonants.

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* ROBINS, SAMUEL D. : *A New Objective Test for Measuring Vividness of uditory, Visual, and Kinæsthetic Imagery.—Psychological Review*, Vol. 27, No. 1, anuary, 1920.

This latter characteristic, is borne out in a type of spelling error made by stammerers, namely, a tendency to lengthen a word, mostly by the addition of a superfluous consonant.

Thus, approximately, 30 per cent of children insert a " c " after the initial letter of words commencing with "s," so that "surface," "saucer," and "succeed" are written as "scurface," "scaucer," and "scucceed." Numerous other instances of both vowel and consonantal addition, a mistake infrequently made by normal children, was noticed in such mis-spellings as "inltelligent" (intelligent), "moyney" (money), whishell " (whistle), and "fleef" (feel). Except for this individual type of blunder the errors of stammerers are similar, in quality and quantity, to those made by normal children. In acuity of hearing the stammerer does not appear to be handicapped ; in fact, defective hearing is rarely a concomitant of stammering. In 522 cases of stammering examined in London centres during the past ten years there were only four with subnormal hearing.* Finally, in general intelligence and cultural level stammerers are not inferior to non-stammerers.†

We cannot, then, ascribe any retardation in spelling amongst stammering children to a defect in articulation, hearing, powers of imagery, or general intelligence, or to paucity of general verbal acquirements. An examination of their scripts in spelling and their written results in other standardized scholastic tests would, however, indicate that the weakness in spelling which is present in some stammerers is due to their general emotional instability. The same inaccuracy of visual perception, lapses in concentration, and errors in recall which characterize their spelling errors are also found in their written arithmetic. Thus stammering is rarely, if ever, a cause of specific disability in spelling, a fact which is substantiated by evidence from the present research in that not one of the 105 children selected from a representative 7,000 pupils of the school population as cases of special backwardness in spelling was a stammerer. We are justified, then, in maintaining that although stammering can definitely exert a detrimental influence on spelling ability, it does so as a general and not a specific force, its actual effect being dependent upon the extent and severity of the nervous instability.

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* BOOME AND RICHARDSON : *The Nature and Treatment of Stammering*, pp. 10-11. (Methuen and Co., 1930.)

† ELIZABETH MCDONNELL : *Educational and Emotional Adjustments of Stuttering Children.*—Teachers' College, Columbia University. Contributions to *Education* No. 314. (New York, 1928.)

VII.—FAULTY PRONUNCIATION AND ITS INFLUENCE ON ACCURATE SPELLING.

Throughout the present investigation there was ample evidence that faulty pronunciation was a prolific contributory cause of misspelling. Naturally, it was never the major or sole causal factor in a case of backwardness, but it was observed that if a child constantly pronounced inaccurately he not infrequently spelt inaccurately and the nature of his written errors bore remarkable similarity to the nature of his spoken errors.

The causes of a child's faulty pronunciation were three :

(*a*) Bad environmental influences of home and companions.
(*b*) Habitual lip laziness.
(*c*) Shyness and inferiority attitude resulting in mumbling, slurring, and clipping words when reading and speaking.

The factors affecting the incidence of mistakes in spelling due to mispronunciation were fourfold. Firstly, this type of error was commonest amongst children from schools of poor social grade. Secondly, younger children were more prone to them than older children. Young children actually say the words aloud when they write* so that there is greater likelihood of pronunciation errors becoming spelling errors. As familiarity with words increases and the mechanics of writing become almost automatic there is less reliance on the articulatory motor and auditory aids and more on the visual and grapho-motor aids. From actually saying the words he passes to an abbreviated form of articulation and thence to " inner speech," when no movement of the lips is perceptible or sound audible, but where there is in most cases a slight movement of the tongue, the soft palate or some other portion of the vocal organs.* Some of the shortcomings in accurate speech of seven, eight, and nine-year-olds disappear with age ; a child might write ferver (further) and eneyfink (anything) at eight, but not at ten.

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* The same characteristic is observed during silent reading, but whereas vocalization is in many cases a hindrance to speed and occasionally to efficiency of comprehension *accurate* vocalization during spelling, especially of long and unfamiliar words, is definitely an aid.

Thirdly, the spelling error due essentially to mispronunciation is more prevalent amongst boys than girls—the proportion in the cases studied was 21·8 per cent to 10 per cent. No doubt this is a further manifestation of that characteristic of tidiness and attention to details which one finds more strongly developed in girls than boys. The girl, more attentive to tidy habits in dress and work, is also more concerned with tidiness in speech.

Fourthly, those who rely on auditory recall are apt to be led astray by faulty pronunciation more frequently than those whose recall is by a visual means.

VIII.—SUMMARY OF CONCLUSIONS.

(1) In an investigation on speech defects and spelling ability it was found that organic defects were much less frequent than functional ones. A speech defect which is at first organic can, even after the cause of the defect has been removed, leave behind it a set of faulty speech habits which have a detrimental influence on attainments in spelling and reading (case of Doris C. described in detail).

(2) Speech defects are a cause of backwardness in spelling and reading on account of the handicap they occasion in setting up a foundation of accurate articulatory-auditory units, a mode of learning and recall which is very much used by young children. Such a handicap is greatly accentuated for these children when too much emphasis is placed on phonic methods and insufficient on visual and kinæsthetic.

(3) Intense functional paraphemia was the speech defect which was the most potent cause of disability in spelling ; it was the major causal factor in the meagre verbal achievements of four out of 105 cases of specific backwardness. This defect, which is due to a lowered power of auditory discrimination in the realm of speech, manifests itself in the pupils' inability to differentiate between phonic elements of similar value, such as " ch " and " sh," " k " and " ch," " f " and " v." Although the cases studied could hear and understand spoken words perfectly,

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* With adults it is debated whether there is any movement in inner speech. *See* PINTNER, R. : *Inner Speech.—Psy. Review,* 1913, XX, 129-153.

REED, H. B. : *The Existence and Function of Inner Speech in Thought Process.—J. of Exp. Psychology,* 1916, 1, pp. 365-392.

THORSON, AGNES M. : *Tongue Movements in Internal Speech.—J. of Exp. Psychology,* Vol. VIII, 1925.

had a good vocabulary, and could converse intelligently provided one became familiar with their inarticulate speech, yet their attainments in spelling and reading were below mental age expectations to the extent of two years in the least pronounced and 4½ years in the most pronounced case.

(4) In every case of speech defect there was evidence of accompanying emotional inhibitions and consequent loss of confidence, which to some extent affected ability in reading, spelling, and composition.

(5) Stammering appears to hinder normal achievement in spelling only in children where the extent and severity of their nervous instability are serious. That is, stammering exerts its influence in a general and not a specific manner; it is never a cause of specific disability in spelling. There are almost as many cases upon whom the defect has no influence as there are those for whom it is a possible cause of inaccurate spelling.

(6) The misspellings of some stammerers show one characteristic error, namely, the tendency to length the word by the addition of a superfluous consonant.

(7) Faulty pronunciation is a minor contributory force in the spelling backwardness of some children.

RÉSUMÉ.

DU RAPPORT ENTRE LA PAROLE DEFECTUEUSE ET LA FAIBLESSE EN ORTHOGRAPHE.

On examina 105 élèves des écoles primaires, faibles en orthographe (et en lecture) mais normaux quant aux autres matières, au moyen d'épreuves mentales, psychologiques, sensorielles et scolaires. On se procura aussi des renseignements sur le tempérament et l'histoire personnelle. Il y avait peu de cas de défectuosités organiques de la parole. La paraphémie fonctionnelle, la diminution de la discrimination auditive en ce qui concerne la parole, était la défectuosité responsable, le plus souvent, de la faiblesse en orthographe ; elle empêche l'enfant de former des unités articulo-auditives. Ce désavantage est accentué si l'on emploie surtout des méthodes phoniques d'enseigner l'orthographe, et la lecture, à cause des inhibitions émotives. Toutes les défectuosités de la parole influençaient le progrès en orthographe, en lecture et en rédaction.

Le bégaiement n'empêche pas le progrès normale en orthographe, sauf dans les cas où le désordre nerveux est extrême. Quelques bègues ont une tendance à allonger un mot en y ajoutant une consonne superflue.

L'articulation défectueuse est une cause moins importante du retard en orthographe des certains jeunes enfants.

ZUSAMMENFASSUNG.

DAS VERHÄLTNIS ZWISCHEN FEHLERHAFTEM SPRECHEN UND UNVERMÖGEN IM BUCHSTABIEREN.

105 Kinder an Volksschulen, deren Leistungen im Buchstabieren (und im Lesen) schwach, in anderen Fächern dagen normal waren, wurden mittels Intelligenz—, psychologischer, Sensoriums—, und Schultests geprüft. Auskunft über persönliche Vorgeschichte und Veranlagung wurde ebenfalls ermittelt. Es gab wenige Fälle von organischem Sprechunvermögen. Funktionelle Paraphemie, eine geschwächte Hörunterscheidungskraft im Sprechgebiet, war der Sprechfehler, der das grösste Sprechunvermögen verursacht; er hindert das Kind daran, genaue Artikulations-und Gehöreinheiten zu bilden. Diese Hemmung wird gesteigert, wenn akustische Lehrmethoden im Buchstabieren und Lesen zu sehr betont werden. Alle Sprechfehler wirkten auf Leistungen im Buchstabieren, Lesen und Aufsatzschreiben durch Gemütshemmungen.

Stammeln hindert normale Leistungen im Buchstabieren erst dann, wenn die Nervenunbeständigkeit intensiv ist. Derartige Stammler sind geneigt, ein Wort durch Hinzufügen eines überflüssigen Konsonanten zu verlängern.

Fehlerhafte Aussprache spielt eine geringfügige Rolle bei Schwäche im Buchstabieren bei kleinen Kindern.

THE RELATION BETWEEN INTELLIGENCE, MECHANICAL ABILITY, AND MANUAL DEXTERITY IN SPECIAL SCHOOL CHILDREN.

BY JOAN ATTENBOROUGH AND MIRIAM FARBER.

(*From the Manchester University Psychological Laboratory.*)

I.—*General problem.*
II.—*Description of tests.*
III.—*Nature of group and conditions of work.*
IV.—*General Table of Correlations.*
V.—*Analysis of results.*
  (*a*) *Intelligence. Problem and results. Discussion and conclusions.*
  (*b*) *Manual dexterity. Problem and results. Discussion and conclusions.*
  (*c*) *Intelligence and manual dexterity. Problem and results. Discussion and conclusions.*
  (*d*) *Intelligence and mechanical ability. Problem and results. Discussion and conclusions.*
  (*e*) *Manual dexterity and mechanical ability. Problem and results. Discussion and conclusions.*
VI.—*Summary.*
VII.—*Appendix.*

I.—GENERAL PROBLEM.

The object of this investigation is :

(*a*) to determine the relation between the abilities measured by linguistic intelligence tests, by performance tests, by manual dexterity tests, and by mechanical ability tests, and

(*b*) to determine the inter-relationship of the respective tests of each ability.

II.—DESCRIPTION OF TESTS

Boys were examined by the following tests :

A.—Intelligence.

(1) Stanford revision of the Binet-Simon Scale ;
(2) Otis Group Test, Primary A ;
(3) Picture Completion II, Healy ;

(4) Cube Imitation, Knox;
(5) Porteus Mazes (Mental and Scholastic Tests, p. 242, Cyril Burt).
(6) Cube Construction (Gaw Report No. 31, Industrial Fatigue Research Board, 1925, p. 22);
(7) Dearborn Formboard (Dearborn).

B.—Manual Ability.

(*a*) Manual Dexterity Series, Whitman (*Journal of Educ. Psych.*, 1925, 16, 118).

(1) Placing brass pins in holes in a board using the preferred hand;
(2) Placing brass pins in holes in a board using the other hand;
(3) Placing three brass pins in each hole using both hands;
(4) Placing wooden pegs in holes in a board;
(5) Disassembling nuts and bolts.
(6) Assembling nuts and bolts; (7) Sorting coloured pegs.
(*b*) Motor tests.
(8) Tapping test with the preferred hand (Whipple Manual of Mental and Physical Tests).
(9) Steadiness test (Control of voluntary movement), (Whipple Manual of Mental and Physical Tests).

C.—Mechanical Ability.

Stenquist's Test of Mechanical Ability, Box III.

(1) Plain nut and bolt;
(2) Bolt and wing nut;
(3) Plain hinge;
(4) Key and ring;
(5) Turn-buckle;
(6) Drawer pull;
(7) Trunk caster;
(8) Plain push ball;
(9) Belt and buckle;
(10) Nail clip.

The correlations were obtained by the use of the Pearson product-moment formula.

III.—NATURE OF GROUP AND CONDITIONS OF WORK.

The present investigation was conducted at a Manchester Education Committee Special School for sub-normal children. The group consisted of eighty boys between the ages of 10 years and 14 years 5 months (two only below the age of 11 years) coming mainly from the poor districts of Manchester.

Their intelligence quotients (Stanford-Binet) were distributed as follows. All but one it will be noticed were below normal :

I.Q.	*No. of Boys.*	*I.Q.*	*No. of Boys.*
45–50	1	70– 75	16
50–55	5	75– 80	10
55–60	7	80– 85	10
60–65	14	85– 90	2
65–70	14	100–105	1

Each investigator had her own room and the boys were examined individually, except when the Otis Primary Group Test was given. Each boy was seated throughout the examination and the material was arranged on the table in front of him. The rooms were well lighted and ventilated. The children were accustomed to frequent medical examinations so that the investigation was in no way an ususual event. The boys enjoyed doing the tests, which were given during school hours, and looked upon them as games.

IV.—GENERAL TABLE OF CORRELATIONS.

	1	2	3	4	5	6	7	8	9	10	11
(1) Stanford Binet	—	·75	·40	·26	·45	·26	·20	·45	·58	·55	·33
(2) Otis Group	·75	—	·46	·41	·50	·43	·39	·55	·64	·51	·27
(3) Healy II	·40	·46	—	·06	·30	·30	·19	·25	·44		
(4) Cube Imitation	·26	·41	·06	—	·34	·12	·11	·30	·26		
(5) Porteus Mazes	·45	·50	·30	·34	—	·38	·08	·40	·60		
(6) Cube Construction	·26	·43	·30	·12	·38	—	·60	·27	·33		
(7) Dearborn Formboard	·20	·39	·19	·11	·08	·60	—	·26	·31		
(8) Mechanical Ability	·45	·55	·25	·30	·40	·27	·26	—	·54	·48	·20
(9) Manual Dexterity	·58	·64	·44	·26	·60	·33	·31	·54	—	·41	·27
(10) Tapping	·55	·51						·48	·41	—	·05
(11) Steadiness	·33	·27						·20	·27	·05	—

V.—ANALYSIS OF RESULTS.

A.—Intelligence.

Problem.—To investigate the relationship between verbal and non-verbal intelligence tests and to see how far performance tests can be substituted for linguistic tests.

Results.—Each individual's score in each test was correlated with his scores in the other tests and the correlation coefficients obtained are given in the table below.

TABLE I.

SHOWING THE INTER-CORRELATIONS OF THE SEVEN INTELLIGENCE TESTS.

Test.	1	2	3	4	5	6	7
(1) Otis Group Test	—	·75	·50	·46	·43	·41	·39
(2) Stanford-Binet. Mental Age ..	·75	—	·45	·40	·26	·26	·20
(3) Porteus Mazes	·50	·45	—	·30	·38	·34	·08
(4) Healy II	·46	·40	·30	—	·30	·06	·19
(5) Cube Construction	·43	·26	·38	·30	—	·12	·60
(6) Cube Imitation..............	·41	·26	·34	·06	·12	—	·11
(7) Dearborn Formboard	·39	·20	·08	·19	·60	·11	—

For r= ·06 Probable error= ·075

Correlations of ·26 and over are greater than three times their probable error. The correlation between the verbal tests of intelligence as a whole and the performance tests as a whole is 0·64 (see Appendix).

From the above table the following conclusions can be drawn :

(*a*) Since all the correlations are positive there are factors common to two or more tests.

(*b*) Otis, which is not a performance test, shows a sufficiently high correlation (0·75) with Stanford-Binet for it to be substituted for the latter as a test of intelligence.

(*c*) An individual performance test cannot safely be used as a substitute for verbal tests of intelligence as represented by Stanford, but as the correlation between verbal and non-verbal intelligence tests is 0·64 a group of performance tests is of more value than individual performance tests as a measure of intelligence.

(*d*) The performance tests show a higher average correlation with Otis (·44) than with Stanford-Binet (·31).

(*e*) The average correlations of cube imitation, cube construction, and Dearborn formboard with Stanford-Binet (·24) are lower than those of the other two performance tests, Healy II and Porteus mazes with Stanford-Binet (·43).

(*f*) Since the performance tests show positive correlations with the standard tests of intelligence (Binet and Otis), they are measuring a common factor, probably intelligence. This is also shown by the correlation of 0·64 between the two types of tests.

(*g*) The average of the inter-correlations (0·209) between the performance tests, excluding that between cube construction and Dearborn formboard, is lower than the average of the correlations (·376) between each performance test and the intelligence tests Binet and Otis.

(*h*) There is a fairly high correlation between cube construction and Dearborn formboard (·60).

Spearman in his Theory of Two Factors states that every mental activity depends upon the operation of two factors—the factor "g," which enters into all activities in greater or less degree, and the factor "s," which is different for every activity. The criterion determining whether or not the abilities which enter into any table of correlations are divisible into "g" and a number of uncorrelated "s" factors is the tetrad difference equation, F=0.

TABLE II.

TETRAD DIFFERENCES FROM TABLE I.

Interval ..	·39 to ·36	·36 to ·33	·33 to ·30	·30 to ·27	·27 to ·24	·24 to ·21	·21 to ·18	·18 to ·15	·15 to ·12	·12 to ·09	·09 to ·06	·06 to ·03	·03 to 0
Frequency	1	1	0	0	2	1	7	3	6	9	11	30	34

Eleven tetrad differences out of a total of 105 were greater than five times their probable error (·038), and in all of the eleven the cube construction and formboard tests were involved. This indicates the presence of a group factor between cube construction and Dearborn formboard.

When Test 7, Dearborn formboard, was eliminated, and the probable error of the tetrad differences of the Tests 1 to 6, inclusive, was calculated, no tetrad difference was found greater than five times the probable error. Hence there is one factor common to the Tests 1 to 6, and no group factor. Similarly it was found that when Test 6 (cube construction) was eliminated, there was again one factor common to all the tests with the exception of cube construction. Since it was probable that age might be a common factor, this was partialled out.

Tests.	*Correlation.*	*Correlation Age partialled out.*
Stanford-Binet Mental Age : Chronological Age . .	·32	—
Otis and Stanford-Binet	·75	·73

The above results show that age does not appreciably alter the correlations. Hence it remains probable that there is one factor " g " common to all the tests.

When the tetrad difference involving cube construction, the formboard, Otis and Stanford was examined it was found to be greater than five times the probable error, thus again indicating the existence of a group factor.

	Formboard.	*Stanford.*
Cube Construction	·60	·26
Otis Group Test	·39	·75

T.D. = ·35 P.E. = ·013

To confirm this, " g " was eliminated from the correlation between cube construction (*a*) and Dearborn formboard (*b*) using Yule's formula for partial correlation.

Stanford was used as a measure of " g."

$$r_{ab}=0{\cdot}60 \qquad r_{ab.g}=0{\cdot}58$$

Hence the existence of a group factor between cube construction and Dearborn formboard is confirmed.

Discussion and conclusions.—While both the performance and the verbal intelligence tests measure a common factor, " g," the results show that it is not justifiable to replace verbal tests by individual non-verbal tests since the highest correlation of the performance tests with the verbal tests was 0·50. Earle, Milner and their co-workers* concluded that for normal subjects performance tests did not measure " g " as successfully as the more verbal type of test. Further, Gaw† states: " It seems that performance tests measure intelligence in somewhat different terms from those in which it is measured by such tests as the Binet-Simon Scale." Thus, the results from *sub-normal* children are similar to those obtained for normal children.

In view of the correlation (0·64) obtained between the groups of verbal and non-verbal tests, it is advisable, when performance tests are used as a measure of intelligence, to use a group of such tests rather than an individual test.

As it was found that the Healy II and the Porteus mazes tests are the performance tests which correlate the highest with Stanford-Binet, it follows that when a single performance test is used one of the two mentioned is to be preferred, certainly for sub-normal children and possibly for normal children.

The results also show the existence of a group factor in the cube construction and Dearborn formboard tests. This was suspected by Earle and his workers, who, however, stated that they obtained no satisfactory proof of the specific correlation between these two tests. From the present investigation it is clear that a group factor is present in the cube construction and the Dearborn formboard tests.

It should be mentioned, however, that the correlations between the several tests used are low, partly because of the fact that the boys tested were not a random sample for the age range dealt with, but were confined to the lower half of the intelligence range. It is further probable that the correlations were attenuated owing to the reliabilities of some of the tests being in all probability relatively low. Circumstances did not permit of the repetition of the tests and so it is not possible to check this possibility.

B.—Manual dexterity.

Problem.—To investigate the relationship (1) between the manual tests and the motor tests, and (2) between the manual tests themselves.

Results.—The sum of each individual's scores in the manual dexterity tests was correlated with his scores in the motor tests, and the correlation coefficients obtained are given in the following table.

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* **Report 53, Industrial Fatigue Research Board.**

† Gaw, *British Journal of Psychology*, 1925, Vol. XV, p. 374.

TABLE III.
INTER-CORRELATIONS OF MANUAL DEXTERITY SERIES AND THE MOTOR TESTS.

Test.	1	2	3
(1) Manual Dexterity Series....................	—	·41	·27
(2) Tapping....................................	·41	—	·05
(3) Steadiness.................................	·27	·05	—

The correlations ·41 and ·27 are greater than three times their P.E.

From the above table the following conclusions can be drawn :

(*a*) The abilities involved in the motor tests of tapping and steadiness are mutually independent.

(*b*) There is some relationship between the three tests since the correlations are positive, but as the correlations between the tests are low, no test can be substituted in practice for any of the others.

The correlation coefficients between each of the tests composing the manual dexterity series are given in the following table :

TABLE IV.
INTER-CORRELATION OF THE TESTS COMPOSING THE MANUAL DEXTERITY SERIES.

Test.	1	2	3	4	5	6	7
(1) Placing pin in holes using the preferred hand..............	—	·79	·65	·50	·47	·47	·18
(2) Placing pin in holes using the other hand................	·79	—	·75	·44	·53	·41	·21
(3) Placing 3 pins in holes using both hands..................	·65	·75	—	·66	·56	·53	·28
(4) Placing pegs in board	·50	·44	·66	—	·33	·50	·38
(5) Disassembling nuts and bolts	·47	·53	·56	·33	—	·57	·15
(6) Assembling nuts and bolts....	·47	·41	·53	·50	·57	—	·30
(7) Sorting....................	·18	·21	·28	·38	·15	·30	—

For $r = ·15$ P.E. = ·074

Correlations over ·21 are greater than three times their P.E.

From the foregoing table the following conclusions can be drawn:

(*a*) Since the correlation coefficients are all positive there are factors common to two or more tests.

(*b*) Since the correlation coefficients of Tests 1 to 6 with Test 7 are much lower than the inter-correlations between the Tests 1 to 6, it seems as if sorting has very little relationship with the other six tests.

(*c*) The inter-correlations between the first six tests suggest the presence of a common factor.

(*d*) Test 7 (Sorting) correlates highest with Test 4, which involves sorting before the pegs can be placed accurately.

To see if there is a factor common to the first six tests of manual dexterity, Spearman's* technique for pooling was followed and the two pools of manual dexterities were correlated with tests of intelligence in two ways:

(*a*)

	M.D.	*Stanford.*
M.D.	·78	·54
Otis	·68	·75

T.D. = ·22 P.E. = ·036

(*b*) As a check the tests were divided into two pools, Manual Dexterity I, consisting of Tests 1, 3, and 6, and Manual Dexterity II, consisting of Tests 2, 4, and 5. These two pools were correlated with tests of intelligence.

	M.D.I.	*Stanford.*
M.D. II	·83	·54
Otis	·62	·75

T.D. = ·29 P.E. = ·038

As the tetrad difference in each case is much more than five times the probable error, the presence of a common group factor in each of the two pools of manual dexterity can be concluded.

To make sure that there is a common factor to the two pools, apart from intelligence, the correlation coefficient between the two pools was calculated by Yule's partial correlation formula, keeping intelligence constant.

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* *Abilities of Man*, 1927. Appendix, p. xxi.

$$r_{M.D.I\,:\,M.D.II} = \cdot 83$$
$$r_{M.D.I\,:\,M.D.II.g} = \cdot 78$$

This confirms the previous conclusion that there is a factor common to both pools of manual dexterity apart from intelligence. The tetrad differences for the first six tests of manual dexterity were calculated and the results obtained are represented in the frequency table below.

TABLE V.

FREQUENCY DISTRIBUTION OF TETRAD DIFFERENCES, TESTS 1 TO 6.

Interval . .	·26–·22	·22–·18	·18–·14	·14–·1	·1–·06	·06–·02	·02–·00
Frequency	1	7	4	8	9	11	5

The probable error for the table is ·039.

The following tetrad differences were greater than five times the probable error :

Test.	*Tetrad Difference.*
1·4 and 2·3	·211
1·5 „ 2·6	·197
1·6 „ 2·5	·255
2·5 „ 3·6	·199
3·5 „ 4·6	·199

Five times probable error= ·1935.

The two groups of tests giving a significant tetrad difference five times the probable error are Tests 1, 2, 3, 4, and Tests 1, 2, 5, 6.

From the above table the following conclusions can be drawn :

(*a*) Since five out of 45 tetrad differences are greater than five times the probable error, the presence of one or more group factors is indicated.

(*b*) The existence of a group factor involving Tests 1, 2, 3, and 4 is indicated.

(*c*) The existence of a group factor involving Tests 1, 2, 5, and 6 is indicated.

Since Tests 1, 2, 3, and 4 involve the same type of response, this may be responsible for the indication of a group factor involving Tests 1, 2, 3, and 4. Tests 1, 2, 5, and 6 involve two different types of response, Tests 1 and 2 involving the same movement, but with different hands, and Tests 5 and 6 involving a screwing movement. Each individual's scores in Tests 1 and 2 were added and correlated with the sum of his scores in Tests 5 and 6.

The tetrad difference was then calculated.

	Preferred and Other Hand.	*Stanford.*
Disassembling and Assembling Nuts and Bolts	·58	·48
Otis	·51	·75

T.D. = ·29. P.E. = ·011.

Since the tetrad difference is far greater than five times the probable error it seems probable that a group factor is present.

To determine whether there is a factor common to the first six manual dexterity tests other than "g," Otis was used as the measure of "g." Using Yule's formula for partial correlation "g" was eliminated.

TABLE VI.

INTER-CORRELATIONS OF THE MANUAL DEXTERITY TESTS 1 TO 6 WHEN "G" IS ELIMINATED.

Test.	1	2	3	4	5	6
(1) Placing pin in holes using the preferred hand	—	·70	·52	·39	·30	·27
(2) Placing pin in holes using the other hand	·70	—	·56	·32	·38	·17
(3) Placing 3 pins in holes using both hands	·52	·56	—	·59	·40	·32
(4) Placing pegs in board	·39	·32	·59	—	·19	·39
(5) Disassembling nuts and bolts	·30	·38	·40	·19	—	·40
(6) Assembling nuts and bolts	·27	·17	·32	·39	·40	—

For $r = ·17$. P.E. = ·073.

All the correlations with the exception of ·19 and 0·17 are greater than three times their probable error.

The foregoing table shows a positive correlation between the tests and indicates the presence of a common factor other than " g." The probable error for the tetrad differences was calculated from this table and found to be ·039. Two out of 45 tetrad differences were higher than five times the probable error, and in these two tetrad differences, Tests 1 and 2 are involved. These two tests, however, involve the same response using different hands. Hence this tends to confirm the probability of a factor other than " g " common to the first six tests of manual dexterity.

The two groups of tests giving a tetrad difference five times the probable error are Tests 1, 2, 3, and 4 and the Tests 1, 2, 5, and 6. This agrees with the conclusions reached previous to the elimination of " g," and strengthens the belief that a group factor involving Tests 1, 2, 5, and 6 may exist.

Discussion and conclusions.—The investigations of Perrin* and Muscio† on tests of Motor capacity and the investigation of the National Institute of Industrial Psychology (Report 4, 1930) on Manual Dexterity have shown that the factors involved in motor ability are mutually independent. The results found in this investigation agree with the previous work as regards the Motor tests, Tapping and Steadiness.

The report of the National Institute stated " that although no general factor of manual dexterity is discoverable the existence of group factors common to and influencing success in certain tests is by no means wholly excluded."

The results obtained in this investigation showed a factor other than " g " common to manual dexterity Tests 1 to 6.

Evidence was adduced for the existence of a group factor involved in responses requiring, on the one hand, the placing of a pin in a hole and, on the other hand, the screwing movement of assembling and disassembling nuts and bolts.

Although there was a common factor involved in the first six manual dexterity tests described, the tests were not sufficiently varied to allow it to be said that there is a common factor for manual dexterity. Nevertheless, the existence of a common factor other than " g " for such a series of tests has not been suspected by previous investigators in the literature that has been consulted.

C.—Intelligence and manual dexterity.

Problem.—To investigate the relationship between intelligence tests and manual dexterity tests.

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* *Experimental Study of Motor Ability*, Perrin.—*Journal of Experimental Psychology*, 1921, IV, p. 24.

† *Motor Capacity*, Muscio.—*British Journal of Psychology*, 1922, XIII, p. 157.

Result.—Each individual's score in each test of manual ability was correlated with his score in Stanford-Binet and Otis, the correlation coefficients obtained are given in the table below.

TABLE VII.

INTER-CORRELATIONS OF STANFORD-BINET, OTIS, AND MANUAL DEXTERITY.

Test.	(1) *Placing pin in holes using preferred hand.*	(2) *Placing pin using other hand.*	(3) *Placing 3 pins using both hands.*	(4) *Placing pegs in board.*	(5) *Disassembling nuts and bolts.*	(6) *Assembling nuts and bolts.*	(7) *Sorting.*	(8) *Tapping*	(9) *Steadiness.*
Stanford-Binet	·48	·44	·42	·44	·38	·53	·34	·55	·33
Otis	·46	·49	·55	·36	·48	·58	·35	·51	·27

All correlations are greater than three times their P.E.

The results show a definite positive correlation between scores in intelligence and scores in manual dexterity tests.

The sum of the scores of each boy in the Manual Dexterity Series was correlated with his score in each Intelligence test. These correlations are given in the following table :

TABLE VIII.

INTER-CORRELATIONS OF MANUAL DEXTERITY SERIES AND INTELLIGENCE TESTS.

Test.	*Stanford-Binet.*	*Otis.*	*Healy II.*	*Cube Imitation.*	*Porteus.*	*Cube Construction.*	*Dearborn Form-board.*
Manual Dexterity Series	·58	·64	·44	·26	·60	·33	·31

All the correlations are greater than three times their P.E.

From the foregoing table the following conclusions can be drawn :

(*a*) Manual Dexterity correlates considerably higher with certain tests of intelligence, Stanford-Binet, Otis and Porteus than with the others.

(*b*) The tests which correlate highly with manual dexterity are those which in practice are most generally accepted as measures of intelligence.

(*c*) There is an indication that Stanford-Binet, Otis, Porteus, and the Manual Dexterity Series (Tests 1 to 7) are measuring some common factors.

To see if there is a factor common to Stanford-Binet, Otis, Porteus, and the Manual Dexterity Series the tetrad differences were calculated from the table shown below.

Test.	1	2	3	4
(1) Stanford	—	·75	·45	·58
(2) Otis	·75	—	·50	·64
(3) Porteus	·45	·50	—	·60
(4) Manual Dexterity Series	·58	·64	·60	—

All the correlations exceed three times their P.E.

No tetrad difference was greater than five times the probable error. Hence there is only one factor common to the tests. As Stanford-Binet and Otis are measures of " g," and they correlate fairly highly with Manual Dexterity, the factor which all three have in common is probably " g."

Discussion and conclusion.—The evidence shows that manual dexterity correlated far more highly with Stanford, Otis, and Porteus than with the other tests of intelligence given. It is noteworthy that Stanford-Binet, Otis and Porteus are most generally accepted as tests of intelligence The only factor common to these intelligence and manual dexterity tests is " g."

Crockett's* measure of manual dexterity correlated ·14 with intelligence. Tauscher† obtained a very low positive correlation between manual dexterity and intelligence. The present investigation—conducted on sub-normal children—revealed much higher correlations between manual dexterity and intelligence, and tapping (manual ability test) and intelligence. This result is noteworthy after the findings of Crockett and Tauscher. These last observers must have employed either :

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* Crockett (quoted in *Psychological Bulletin*, 1932, XXIX, p. 95).

† Tauscher, *Über die Korrelation zwischen Handgeschicklicheit Und Intelligenz* (quoted in *Psychological Abstracts*, 1931, V, No. 6, p. 309).

(*a*) Tests of manual dexterity similar to those used in the present study—in which case their results cannot be extended to sub-normal children ; or

(*b*) Tests of manual dexterity different from those used here—in which case a series of manual dexterity tests has been found showing a fairly high correlation with intelligence. Again, this may be dependent on the fact that the group of children used in the present study was sub-normal, and the range of intelligence limited.

D.—Intelligence and mechanical ability.

Problem.—To investigate the relationship between the intelligence tests and the test of mechanical ability.

Result.—The correlations between the mechanical ability and intelligence tests obtained are given in the following table.

TABLE IX.

CORRELATIONS BETWEEN MECHANICAL ABILITY TEST AND THE INTELLIGENCE TESTS.

	Stanford-Binet.	*Otis Group.*	*Healy II.*	*Cube Imitation.*	*Cube Construction*	*Porteus Mazes.*	*Dearborn Formboard.*
Mechanical Ability ..	·45	·55	·25	·30	·27	·40	·26

When r = ·25, P.E. = ·072.

From the above table the following conclusions can be drawn :

(*a*) Since all the correlation coefficients are positive and significant there is some relationship between each test and the test of mechanical ability.

(*b*) The test of mechanical ability correlates most highly with the three most widely accepted tests of intelligence given, Stanford-Binet, Otis, and Porteus mazes.

(*c*) The test of mechanical ability does not correlate highly with the cube construction and formboard tests, which have been described as tests of spatial perception.* We were unable to retest the children and so obtain a reliability coefficient and none of the literature consulted gave the reliability of this particular test of mechanical ability.

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* Earle and Milner, *Industrial Fatigue Research Board Report*, No. 53, 1929.

To determine whether there is only one factor common to the intelligence tests and the test of mechanical ability the tetrad differences of the inter-correlation coefficients of these tests were calculated. These are given in the table below :

TABLE X.

TETRAD DIFFERENCES INVOLVING THE TESTS OF INTELLIGENCE AND MECHANICAL ABILITY.

Interval . .	·39 to ·36	·36 to ·33	·33 to ·30	·30 to ·27	·27 to ·24	·24 to ·21	·21 to ·18	·18 to ·15	·15 to ·12	·12 to ·09	·09 to ·06	·06 to ·03	·03 to ·0
Frequency	1	1	0	0	2	5	8	5	7	13	32	63	73

P.E. = ·037.

When the tetrad differences involving cube construction and Dearborn formboard are eliminated, none of the tetrad differences involving the test of mechanical ability are greater than five times the probable error. Hence there is only one factor " g " common to the tests.

TABLE XI.

CORRELATIONS BETWEEN THE MECHANICAL ABILITY TEST AND THE PERFORMANCE TESTS WITH " G " ELIMINATED.

	Healy II.	*Cube Imitation.*	*Cube Construction.*	*Porteus Mazes.*	*Dearborn Formboard.*
Mechanical Ability.	·08	·21	·18	·25	·19

$r = \cdot 25$ P.E. = ·072.

When " g " is eliminated from the correlations between the test of mechanical ability and the performance tests by Yule's formula for partial correlation (Stanford-Binet being used as a measure of " g ") only one of the correlations is significant and this not to any great extent. (See the above table.) This is in agreement with the foregoing conclusion that there is only one factor common to the tests.

Discussion and conclusions.—The correlation of the test of mechanical ability with intelligence is higher than was expected considering that it is a test of a special and not of general ability ; but there is no factor other than " g " common to the tests of intelligence and mechanical ability.

This result is not in agreement with the results of other investigators of mechanical ability, their correlations of mechanical ability with intelligence being lower and generally insignificant. Of these investigators only Gaw used the same test of mechanical ability that was given in this investigation. Gaw used the same test but, since her result of ·31 was obtained by correlating the scores in the mechanical ability test with the Stanford-Binet I.Q.'s and not with the mental ages, her result is not comparable to the result of this investigation.

The dissimilarity of the foregoing results with those of other investigators may be due to the fact that:

(*a*) The tests employed were not the same; or

(*b*) The children tested in this group were sub-normal.

E.—Manual dexterity and mechanical ability.

Problem.—To investigate the relationship between manual dexterity and mechanical ability as measured by the tests given.

Results.—Each individual's score in each test of manual dexterity was correlated with his score in the mechanical test; and the correlation coefficients obtained are given in the following table.

TABLE XII.

CORRELATIONS BETWEEN MANUAL DEXTERITY AND MECHANICAL ABILITY.

Test.	(1) *Placing pin in holes using preferred hand.*	(2) *Placing pin using other hand.*	(3) *Placing three pins using both hands.*	(4) *Placing pegs in board.*
Mechanical Ability ..	·39	·40	·39	·25

Test.	(5) *Disassembling nuts and bolts.*	(6) *Assembling nuts and bolts.*	(7) *Sorting.*	(8) *Whitman Series (Total).*	(9) *Tapping*	(10) *Steadiness.*
Mechanical Ability....	·31	·36	·28	·54	·48	·20

Correlations including and greater than ·25 are greater than three times their probable error.

From the above table the following conclusions can be drawn:

(*a*) Since all the correlations are positive there is some relationship between the tests.

(*b*) The correlations of all the tests in the Whitman series with mechanical ability are significant.

(*c*) The correlation of the Whitman series as a whole with mechanical ability is greater than any of the correlations of each test in the series with mechanical ability.

(*d*) Of the tapping and the steadiness tests, the two manual dexterity tests other than the Whitman series, only the tapping test has a significant correlation with mechanical ability.

To determine whether there is a factor other than " g " common to the manual and mechanical ability tests " g " was eliminated by means of Yule's formula for partial correlation using the Stanford-Binet Scale as a measure of " g." These correlations are given in the table below :

TABLE XIII.

CORRELATIONS BETWEEN MANUAL DEXTERITY AND MECHANICAL ABILITY TESTS WHEN " G " IS HELD CONSTANT.

Test.	(1) *Placing pin in holes using preferred hand.*	(2) *Placing pin using other hand.*	(3) *Placing three pins using both hands.*	(4) *Placing pegs in board.*
Mechanical Ability ..	·22	·25	·25	·06

Test.	(5) *Disassembling nuts and bolts.*	(6) *Assembling nuts and bolts.*	(7) *Sorting.*	(8) *Whitman Series.*	(9) *Tapping.*	(10) *Steadiness.*
Mechanical Ability ..	·17	·16	·06	·38	·31	·06

When $r = \cdot 22$, P.E. $= \cdot 074$.

All correlations greater than ·22 exceed three times their P.E.

The above table shows that there is some relationship between the Whitman series and mechanical ability other than "g." As it was thought that age might be responsible for the correlation obtained it was partialled out, the resulting correlation being 0·32. Therefore there is some factor common to the Whitman series and mechanical ability other than " g " and age.

Discussion and conclusions.—The evidence shows that there is more than one factor "g" common to the manual dexterity and mechanical ability tests. This second factor is not age. Therefore the manual and mechanical abilities are not mutually independent.

SUMMARY.

(1) An investigation is described in which a group of sub-normal children (number varying from 74 to 80) is tested by verbal and non-verbal intelligence, manual dexterity and mechanical ability tests.

(2) A common factor "g" is measured by the tests of intelligence, manual and mechanical abilities.

(3) It is not found justifiable to replace verbal by individual non-verbal tests as measures of intelligence.

(4) A fairly high correlation is found between verbal and non-verbal intelligence tests, 0·64. Hence when verbal tests cannot be used it is more advisable that a *group* of performance tests be used.

(5) The presence of a group factor in the cube construction and Dearborn formboard tests is shown.

(6) A fairly high correlation is found between the manual dexterity series and intelligence (·58).

(7) A fairly high correlation is found between the mechanical ability test and intelligence (·45).

(8) No factor other than "g" is found between any of the performance tests and the test of mechanical ability.

(9) The abilities involved in the motor tests of tapping and steadiness are mutually independent.

(10) A common factor other than "g" is found in six manual dexterity tests.

(11) A group factor present in tests involving two types of movement is indicated.

(12) There is some relationship between manual dexterity and mechanical ability other than "g."

(13) No reliability coefficients could be obtained as the tests were only given once.

(14) The range of intelligence of the boys tested is limited thus tending to lower the correlations.

(15) The results obtained are discussed in connection with the relevant literature.

We wish to thank Professor T. H. Pear, the Manchester Education Committee, and Mr. Messer for their help in providing facilities for this investigation. We are grateful to Mr. H. E. O. James for much advice and assistance.

APPENDIX.

Regarding the Otis Group test and the Stanford-Binet as different forms of the same test, the reliability coefficient was calculated, using Kelly's formula 157, Statistical Method, p. 205.

$$r_{2\cdot II} = \frac{ar_{II}}{1+(a-1)\,r_{II}} = \frac{2\times 0\cdot 75}{1+(2-1)\,0\cdot 75} = 0\cdot 86.$$

where r_{II} = correlation between Otis and Stanford-Binet; and a = number of tests.

Regarding the Porteus, Healy, etc., as different forms of the same test, the reliability coefficient was calculated using the same formula.

$$r_{5\cdot V} = \frac{ar_{II}}{1+(a-1)\,r_{II}} = \frac{5\times 0\cdot 248}{1+(5-1)\cdot 248} = 0\cdot 62$$

where r_{II} = average inter correlation between the performance tests.

The relationship between the verbal and non-verbal tests of intelligence was calculated using Kelly's formula 154, Statistical Method, p. 204.

	1	2	3	4	5	6	7
(1) Otis Group	—	·75	·50	·46	·43	·41	·39
(2) Stanford-Binet........	—	—	·45	·40	·26	·26	·20
(3) Porteus Mazes	—	—	—	·30	·38	·34	·08
(4) Healy II	—	—	—	—	·30	·06	·19
(5) Cube Construction	—	—	—	—	—	·12	60
(6) Cube Imitation	—	—	—	—	—	—	·11
(7) Dearborn	—	—	—	—	—	—	—

Wanted r (1+2) (3+4+5+6+7)

$$= \frac{a\ b\ \bar{r}_{PQ}}{\sqrt{a+(a^2-a)\,r_{pq}}\ \sqrt{b+(b^2-b)\,\bar{r}_{PQ}}}$$

$$= \frac{2.\ 5.\ r_{PQ}}{\sqrt{2+(2^2-2)\,\bar{r}_{pq}}\ \sqrt{5+(5^2-5)\,\bar{r}_{PQ}}}$$

$\bar{r}_{pQ}$ is the mean of correlations between one test of intelligence and one test of performance$=0{\cdot}376$.

$\bar{r}_{pq}$ is the mean of correlations between intelligence tests$=0{\cdot}75$.

$\bar{r}_{PQ}$ is the mean of correlations between the performance tests$=0{\cdot}248$.

$$\therefore r_{2I.\,P5.}=\frac{10\ {\cdot}376}{\sqrt{2+2\,({\cdot}75)}\sqrt{5+20\,({\cdot}248)}}$$

$$=\frac{3{\cdot}76}{\sqrt{3{\cdot}5\times 9{\cdot}96}}$$

$$=0{\cdot}64$$

RÉSUMÉ.

DU RAPPORT ENTRE L'INTELLIGENCE, L'APTITUDE MÉCANIQUE ET LA DEXTÉRITÉ.

1.—On examina un groupe de garçons sous-normaux, dont le nombre variait de 74 à 80, et l'âge de onze à quatorze ans, et qui allaient à une École spéciale à Manchester.

2.—On les examina au moyen :

(a) de tests d'intelligence verbaux et non-verbaux.
(b) de tests de dextérité.
(c) de tests d'aptitude mécanique.

3.—On découvrit que les tests mesuraient un facteur commun " g."

4.—On ne le trouva pas légitime de remplacer des tests verbaux par des tests individuels non-verbaux, pour mesurer l'intelligence.

5.—On démontra la présence d'un facteur commun dans la construction des cubes et le " Dearborn formboard."

6.—On trouva que la corrélation entre la dextérité et l'intelligence était ·58.

7.—On trouva que la corrélation entre l'aptitude mécanique et l'intelligence était ·45.

8.—Les aptitudes éprouvées par les tests moteurs du Tapement et de la Régularité se montrèrent indépendentes les unes des autres.

9—On découvrit dans six tests de dextérité un facteur commun autre que " g."

10.—Il existe un rapport autre que " g " entre la dextérité et l'aptitude mécanique.

ZUSAMMENFASSUNG.

DAS VERHÄLTNIS ZWISCHEN INTELLIGENZ, MECHANISCHEM KÖNNEN UND FINGERFERTIGKEIT BEI KINDERN AN EINER SPEZIALSCHULE.

1.—Eine Gruppe unternormaler Knaben, deren Zahl sich von 74 bis 80 und auf ein Alter von 11 bis 14 erstreckte, an einer Spezialschule in Manchester wurde geprüft.

2.—Sie wurden geprüft durch:

(a) Wort-und Nichtwortintelligenztests.
(b) Tests für Fingerfertigkeit.
(c) Tests für mechanisches Können.

3.—Man fand heraus, dass die Tests einen gemeinsamen Faktor " g " massen.

4.—Man hat das Ersetzen von Wort-durch individuelle Nichtworttests als Masstab der Intelligenz nicht rechtfertigen können.

5.—Das Vorhandensein eines Gruppenfaktors im Würfelaufbau und im Dearborn'schen Formenbrett zeigte sich.

6.—Die Korrelation zwischen Fingerfertigkeit und Intelligenz zeigte sich als ,58.

7.—Die Korrelation zwischen mechanischer Fertigkeit und Intelligenz war, ,45.

8.—Man fand heraus, dass die zu den motorischen Tapping-und Festigkeitstests gehörigen Faktoren von einander unabhängig waren.

9.—Ein gemainsamer Faktor ausser " g " wurde bei sechs Fingerfertigkeitstests ausfindig gemacht.

10.—Es besteht ein Verhältnis zwischen Finger-und mechanischer Fertigkeit ausser " g."

AN ENQUIRY AS TO ÆSTHETIC JUDGMENTS OF CHILDREN.

By MARGARET H. BULLEY.

I.—*Description of the test.*
II.—*Main results of the enquiry.*
III.—*Comparison of present test and results of picture test.*
IV.—*Boys' and girls' preferences and remarks.*
V.—*Conclusion.*

I.—Description of the test.

In January, 1933, Professor Cyril Burt gave a broadcast talk on "Art and Psychology." In connection with this talk I co-operated with him in arranging a test in æsthetic sensibility. *The Listener* published the test material and the questionnaire,* and, subsequently, two short articles on the results of the test, the first by Professor Burt, describing briefly the answers of adults,† the second by myself, dealing with some of the replies sent in by boys and girls.‡ The purpose of this article is to give a fuller account of the latter, and I would like here to thank the Editor of *The Listener* for permission to include some of the information already given to his readers in summary form.

The test aroused great interest, and the questionnaire was answered by over 10,000 people. The test material consisted of illustrations of nine pairs of contrasted objects of household or domestic use, each contrast representing a better and a worse example from the point of æsthetic value. There were two book-cases, two armchairs, two coffee pots, two two-handled jars, two printed voiles, two pieces of embroidery, two champagne glasses, two pieces of jewellery, and two teapots. These illustrations had been previously submitted to six well-known art critics or experts§ who had unanimously and independently agreed as to the relative æsthetic value of each pair of contrasts. In consequence, these

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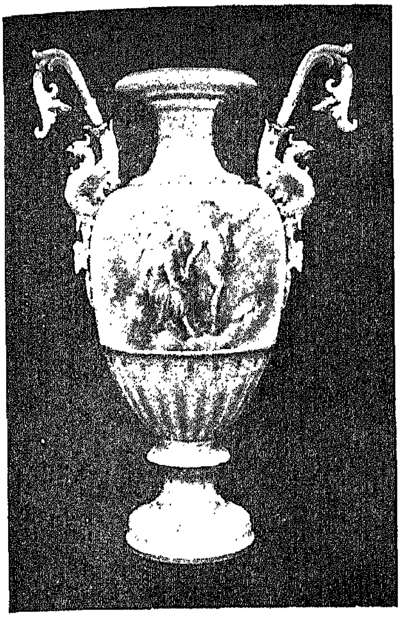
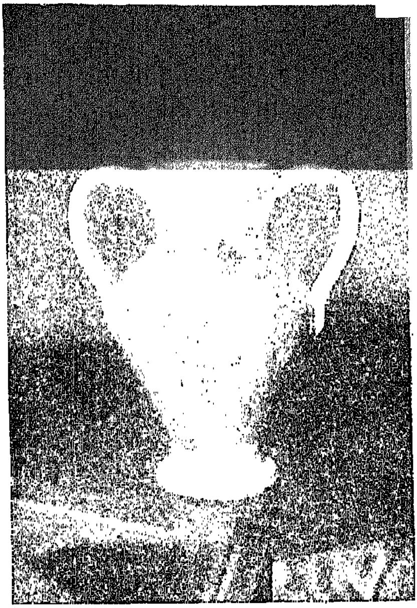
* 18th January, 1933.

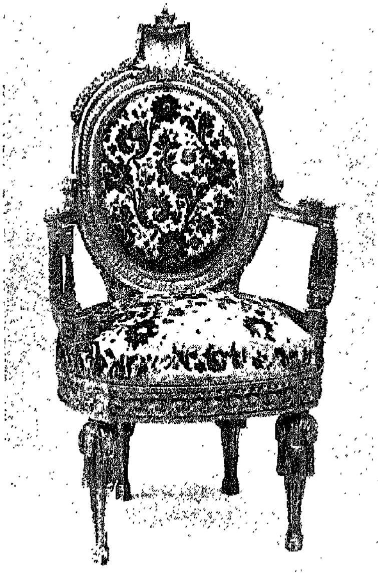
† 8th February, 1933.

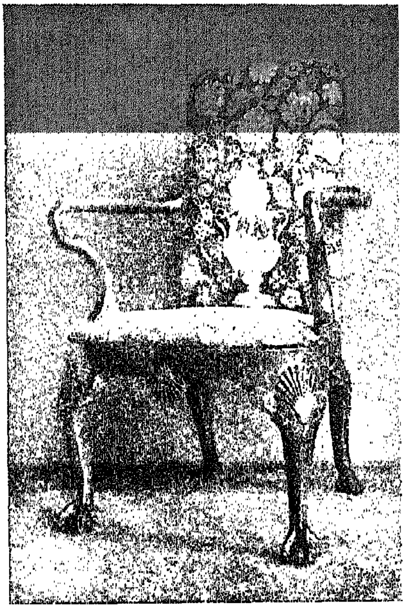
‡ 27th December, 1933.

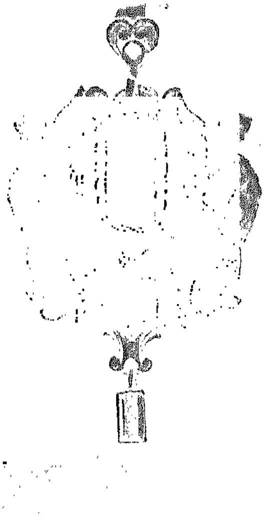
§ Professor CONSTABLE, *Director of the Courtauld Institute of Fine Art, University of London.*
Professor ROGER FRY, *Slade Professor of Fine Art, University of Cambridge.*
Sir CHARLES HOLMES, *late Director of the National Gallery.*
Mr. P. W. JOWETT, *Director of the Central School of Arts and Crafts, London.*
Sir ERIC MACLAGAN, *Director of the Victoria and Albert Museum.*
Mr. R. R. TATLOCK, *Editor of the "Burlington Magazine."*











judgments have been accepted as valid, and the children's replies have been marked accordingly. Four of the comparisons are here illustrated. Those who wish to see them all, together with a number of other contrasted objects, or to use them for further tests, can find them in a book called *Have You Good Taste?* together with critical notes and information in regard to their choice. A full account by Professor Burt of the adults' answers to the questionnaire is included in the same volume.*

The questionnaire was as follows : Readers were asked to state their

(1) Sex.
(2) Age (" adult " will do if over 21).
(3) Trade or profession (to be indicated as precisely as possible).
(4) Education (elementary, secondary and/or university).
(5) State (*a*) Whether you practise any form of art or craft (including music and literature), and (*b*) Whether you have had any special training in any of them.
(6) Preferences. (Here followed the nine contrasts with a distinguishing letter and number for each object.)
(7) A brief note of the reasons for preferences would be of interest though not essential.

The object of the test was three-fold: to stimulate a thoughtful and critical interest in the lesser arts, not only in the interests of the individual but of the nation ; to gather information as to public taste with a view to education ; and to learn a little more, if possible, about æsthetic judgment in regard to the lesser arts. As far as children were concerned the object was to find out if taste differed according to (*a*) age, (*b*) sex, (*c*) education in general, including, of necessity, home influence, (*d*) special forms of art teaching ; also to see if a comparison could be made between certain results obtained in a test made some years ago with paintings, when 2,000 boys and girls from elementary schools and also foreign children were tested.† It must, however, be emphasised that the results obtained in these tests are of suggestive rather than scientific value. The present test, in the case of the children, was given under varying circumstances by a large number of different people. The paper on which the illustrations were printed was not suitable for the clear reproduction of detail. Certain contrasts were planned to catch adults tripping and to reveal to what extent æsthetic values would be obscured by associated ideas. Such ideas, of course, are always present. But here they were present in a marked degree.

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* MARGARET H. BULLEY. (Methuen, 1933. 3s. 6d.)

† For an account of this test see *Art and Counterfeit* : MARGARET H. BULLEY. (Methuen, 1925. 15s.)

It must also be made clear that the words "good taste" are not used to indicate set standards or styles, or fashionable preferences. They are meant to refer to discernment, even if faint, of a living principle of harmony. This principle shapes the work of all ages, countries, and types, from savage weaving to Chinese bowls and Queen Anne chairs, and, to a great extent, the best modern factory product. It is the living tradition of art in the great and universal sense of the word.

II.—Main results of the enquiry.

Graph 1 illustrates the main results of the enquiry. The numbers along the horizontal base-line show the ages of the girls and boys; numbers along the vertical lines, the average marks gained out of a possible nine. On the right-hand side are also shown the average marks gained in the same test by various groups of adults, as tabulated by Professor Burt. These included men and women of elementary, secondary, and university education, art teachers, artists, etc. The average mark of all boys and girls doing the test is shown for comparison.

Curve E-G represents the average number of marks gained by 708 elementary girls; Curve E-B those of 1,201 elementary boys; Curve S-G those of 2,497 secondary girls; Curve S-B those of 1,791 secondary boys. Curves 1-3 may, perhaps, be taken to illustrate the effect of good art teaching on critical sensibility in four special schools. Curve 1 represents results from two private girls' schools combined (72 girls). In each instance the girls come from homes where a high level of taste is to be expected. In each the teaching and inspection is given by Miss Marion Richardson and her sister, Miss K. Richardson. Curve 2 represents the averages of a big girls' secondary school in the Black Country (284 girls). The pupils are largely drawn from the small shopkeeping class, and include a considerable number of scholars from the elementary schools. The art teaching was given, in the first place, by Miss Marion Richardson, but for a number of years has been carried on by others, although on similar lines.

Curve 3 gives the averages of a small anonymous school sent in by an anonymous teacher (37 girls). The number of boys and girls in each age group represented on the graph are as follows:*

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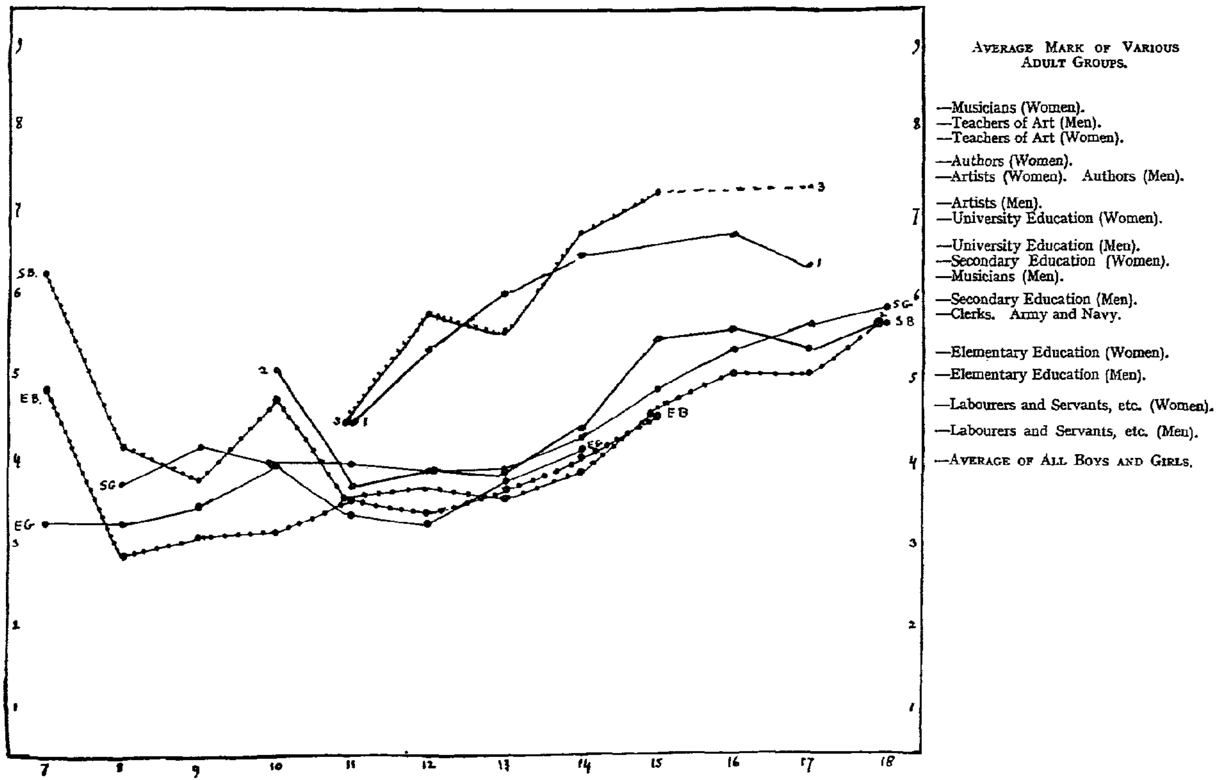
* The questionnaire was answered by a small number of children receiving home education and by some boys and girls who had left their elementary schools. They are included in these age groups. Certain groups of children of six, and of secondary girls under eight, have been omitted from the graph as being too small to be of value. The 15-17 year olds in Curve 3 have been averaged and grouped as one.

GRAPH I.


AVERAGE MARK OF VARIOUS ADULT GROUPS.
—Musicians (Women).
—Teachers of Art (Men).
—Teachers of Art (Women).
—Authors (Women).
—Artists (Women). Authors (Men).
—Artists (Men).
—University Education (Women).
—University Education (Men).
—Secondary Education (Women).
—Musicians (Men).
—Secondary Education (Men).
—Clerks. Army and Navy.
—Elementary Education (Women).
—Elementary Education (Men).
—Labourers and Servants, etc. (Women).
—Labourers and Servants, etc. (Men).
—AVERAGE OF ALL BOYS AND GIRLS.
9
8
7
6
5
4
3
2
1
7
8
9
10
11
12
13
14
15
16
17
18
SB.
EB.
EG
SG
SG
SB
EB
EB
1
2
3

Age.	*Elementary Girls.* *Curve E-G.*	*Elementary Boys.* *Curve E-B.*	*Secondary Girls.* *Curve S-G.*	*Secondary Boys.* *Curve E-B.*	*Two Private Schools, Girls. Curve 1.*	*High School, Girls.* *Curve 2.*	*Small Private School, Girls. Curve 3.*
7	31	42	—	27	—	—	—
8	54	72	40	22	—	—	—
9	33	57	52	51	—	—	—
10	57	83	87	106	—	22	—
11	168	156	263	181	8	38	8
12	200	306	474	327	9	70	5
13	136	281	518	333	10	50	6
14	29	138	337	261	15	39	5
15	—	66	276	194	10	24	6
16	—	—	274	156	15	23	4
17	—	—	124	79	5	11	3
18–19	—	—	52	54	—	7	—
	708	1201	2497	1791	72	284	37

In considering the results it is obvious that the averages of the elementary children from 11-14, and of the secondary boys and girls from 11-16, must be taken as the most trustworthy, since by far the greater number of boys and girls tested were of this age. Only a small number of children under 10 did the test, hence the average for the lower ages must be regarded as very unreliable, a conclusion borne out by the fluctuations of the curves below the age of 10. It is doubtful, for instance, whether the taste of the seven year old boys is really better than that of the seven year old girls. In the picture test previously mentioned the averages of boys and girls of 6-8 were higher than they were at any subsequent (elementary) school age. These points are well worth study, and suggest an interesting field for further investigation.

Although it would be exceedingly difficult to determine precisely the motives for the children's preferences, there seems to be little doubt that when they reach the age of 10 taste begins to decline until it touches bottom round about 11-13. Then a change sets in. Taste steadily improves until it merges into the general level of adult taste (or lack of taste). Although some degree of critical judgment is found at all ages, it is at about 16 that it becomes more marked. It is of particular interest to note that from the age of 13 in each test taste follows a similar upward direction as the child gets older. We may reasonably infer that æsthetic values were also recognized in the objects of household use and played a part in conditioning the child's selection.

Little children often have a keen sense of æsthetic value. They may begin by simply saying : " I like this because we have one like it at home," but they may go on to add : " And because it goes like this and like this " (following a rhythm with one finger). At times, however, it may be largely chance which determines the reason they give for liking the object they actually vote for. But no one can doubt the young child's natural feeling for form and colour who has seen the remarkable designs produced in many infants' schools in the London area, under the direction of Miss Marion Richardson. Further, a child may like an object not only for its æsthetic value but also for some associated idea which it suggests. A recorded choice may be the outcome of very mixed and complex factors. But this only makes the broad correspondence of the curves all the more striking.

It is interesting to observe the surprising similarity of certain results obtained independently by Professor Burt and by myself—Professor Burt analysing the answers of adults and myself analyzing those of the boys and girls. In each instance these results reveal the relative approximation of the taste of the oldest elementary school children to that of adults of elementary education, and of the secondary school boys and girls to adults of secondary education. Prolong the education by a year or two and the averages would, no doubt, coincide. It is tempting to infer that certain objective values exist in the more beautiful objects and that more or less definite reactions are called out by these values at given ages and under certain conditions.

There appears to be little difference between the judgments of the elementary boys and girls. The latter have a slight advantage. This is true also of the secondary school girls and of adults. Professor Burt's figures show women ahead of men in every group except that of art teachers. Is this difference between the sexes due to something innate or to tradition, training, or other accidental circumstance? The man's nature is, perhaps, more blindly creative, the women's more fastidious. She is the careful shopper, even if her judgments are crude. The girl thinks of her dress more than the boy of his suit. Does education play a part? Lessons in handwork are now almost universal, but whereas the girls' embroidery lessons have generally a bad influence on taste owing to the bad designs used, carpentry classes for boys (as opposed to fretwork and much carving) may be a help. The lack of any good teaching in the nature of design is well known and has recently been made clear by answers to a questionnaire circulated by a contemporary journal.* Whatever the reason or reasons may be, the evidence enforces the conclusion that many commercial, civil service, and other posts that are regarded as the prerogative of men could be held with equal or better advantage by women.

The smallness of the difference between the taste of elementary and secondary school children is probably largely due to the fact that the answers sent in by secondary schools were, for the most part, from schools containing large numbers of pupils from elementary schools. If the education of the other elementary school children had been prolonged would their averages have approximated to those of the secondary schools? Or would the superior intelligence of the scholarship winners make a difference? Good art teaching might, to a certain extent, have counteracted the influence of poor home surroundings. But critical discernment means powers of detachment and these the higher education may, perhaps, give. In the picture test the boys and girls from continuation schools and clubs did not do as well as the older scholars in the secondary schools.

It must, however, be realized that this power of detachment is not necessarily a good thing for the creative artist. Creative impulse and critical discernment are different aspects of æsthetic activity which may or may not be found in the same person. Professor Burt's analysis shows that teachers of art did better in the test than artists. A child absorbed in creation may be blind to the values of art in the work of another while producing them unconsciously in his own work. For this reason we must be alive to the danger of attempting to develop the critical faculties in a child who is still young enough to live the imaginative life and create spontaneously without self-consciousness. By 16-17 the power of critical detachment will assert itself naturally and it is then that wise guidance in the training of sensibility can be given without harm. A love of beauty will enrich the child for life and should form part of a liberal education. It is also a matter of practical importance. The child grows up into the shopper and home-maker and so plays a part in the demand for better things. The average producer, distributor, and salesman has had no training in æsthetic discernment. Yet it is he who commissions or pushes designs and so gives the public the chance of seeing and buying either the good, bad, or indifferent—of supporting the good artist or leaving him to starve. In Sweden, where the relation of art to industry has been more carefully studied and more successfully demonstrated than in any other country, the education of the taste of both public and producer is considered an integral part of the movement. The question becomes one of national importance. The training of the exceptional child who is to become the professional artist or designer is yet another problem and one which cannot be considered here.

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* *Design for To-day*, April, 1934.

The averages represented by Curves 1-3 raise a series of interesting questions. The teaching in the large girls' high school (Curve 2), although very good, is no longer under the supervision of its originator. This places it at a disadvantage as compared with the two private schools (Curve 1), where Miss Richardson and her sister are in direct control. But more probably the difference in the averages is largely due to the fact, already stated, that the girls in these schools come from cultured homes, while the girls in the big high school come from the homes of the lower middle-classes, where a beautiful object is rarely seen. It would seem, therefore, that even the best art teaching cannot counteract the persistent influence of ugliness in home surroundings. The handicap is too severe. On the other hand, the elder girls in the two private schools do better in the test than the average men and women of secondary education, and approach the level of taste shown by university men and women. To what extent this result is due to home influence, to what extent to teaching, it would be hard to say; and we must not forget that even the homes of intellectuals can be painfully ugly.

In all three schools no training in the "appreciation" of art is given.* Good reproductions of works of art hang on the walls, but they are left for the most part to do their work in silence. The girls' discrimination is fostered in the best possible way,—through their own work. Will their understanding develop and deepen when they are no longer under their teacher's influence and when no help has been given to foster a more reasoned background to intuitive understanding? We do not know.

In this connection the averages of the small private school have been separately shown (Curve 3). The art mistress of this school stated that her elder pupils had been given training in the application of art on lines laid down in certain books. Of art teaching in the ordinary sense she made no mention. She would, no doubt, be interested to know that in so far as it has been possible to judge, her girls have done better in the test than any other group of boys and girls of any age. The numbers in the group, however, are very small, and not much importance can be attached to them.

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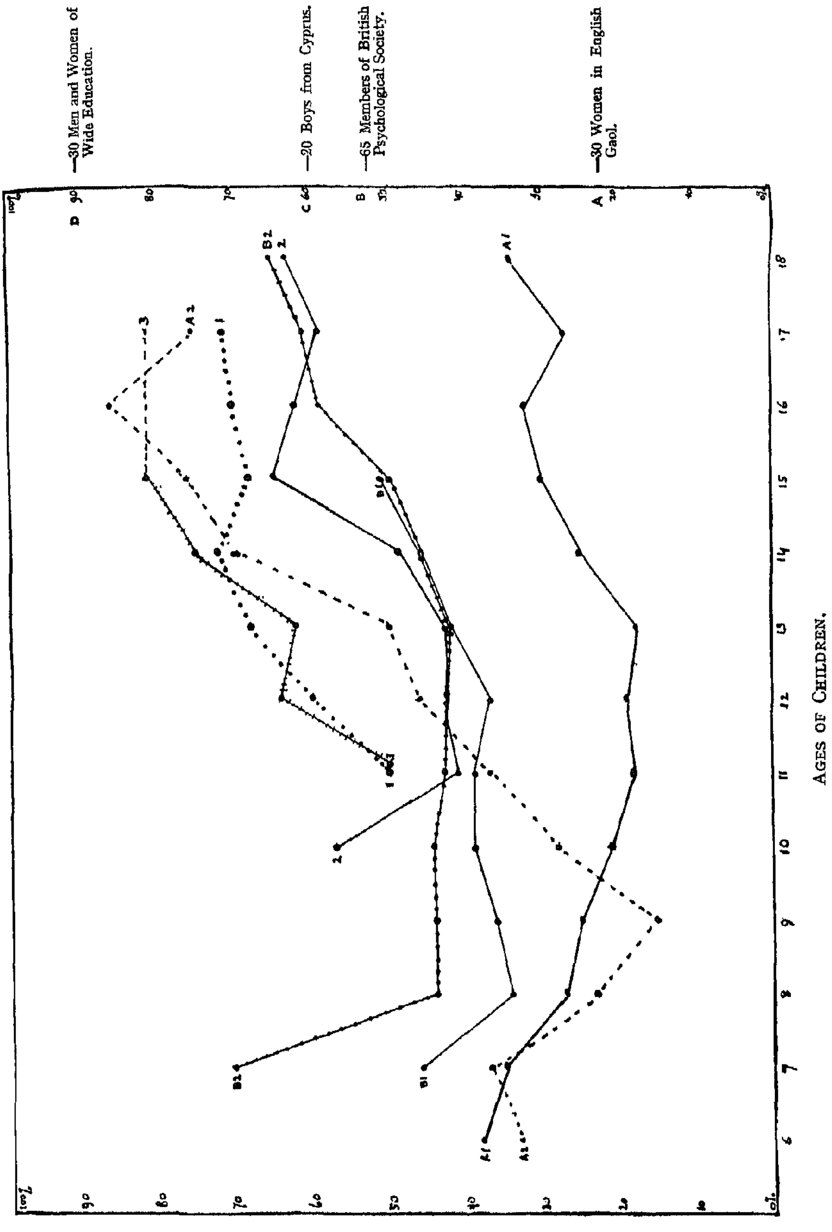
* It is very much to be hoped that a better word can be found than "appreciation."

The present test furnishes interesting evidence of the effect on taste of teaching that has obviously been given on "functional" lines. "Fitness for purpose" can be an excellent basis for creative work, but it evidently leads children astray if taken as a criterion of æsthetic value. In three boys' schools the boys repeatedly give "fitness for purpose" as their reason for preference. This leads to some strange reversals of taste. In one school nearly every boy votes against the universally-popular and well-proportioned wine glass on the grounds that the clumsy contrasted example is stronger and would hold more, while the ugly bookcase is chosen for the same reasons. On the other hand, almost all vote against the hideous two-handled jar, dearly beloved by all but the oldest boys and girls. It is described as over-elaborate. Most boys choose the better coffee pot because it is plainer, but not for the right reason—the better equilibrium of the parts. Nearly all choose the worse voile and embroidery because they also are "plainer." The better jewel gains most votes for the same reason. The chairs are found puzzling, because they are equally elaborate, and opinion is also divided about the teapots. "Fitness for purpose" generally explains choice in either instance.

It would be interesting to know if these boys and also the older girls who got such high averages *like* the things they vote for. An intelligent boy or girl detects so quickly the kind of choice the teacher would approve ("all the things I don't like I say are art," as one boy of twelve remarked in the test with paintings). Give a functionalist boy half-a-crown and which two-handled jar will he buy for his mother when he slips round the corner? Will an older girl be proof against the familiar mechanical rose when she chooses her own frock? Where teaching is good we shall find both discrimination and sincerity.

Some unexpected results were sent by a French Lycée. In the test with paintings French children did better than English. But in this test the boys in question make only 16 per cent of right choices. The most popular of the better objects is, as in England, the wine glass. But in all other instances the worse rather than the better object is preferred. No doubt the curvilinear designs of the ugly bookcase and poorer coffee pot are more familiar in type. Not unnaturally the French chair is preferred. But it is difficult to find an explanation for the approval, for example, of the poorer jewel.


—30 Men and Women of Wide Education.
—20 Boys from Cyprus.
—65 Members of British Psychological Society.
—30 Women in English Gaol.
D 90
C 60
B
A
100%
90
80
70
60
50
40
30
20
10
0%
6
7
8
9
10
11
12
13
14
15
16
17
18
B2
B1
A1
A2
1
2
3
AGES OF CHILDREN.

III.—COMPARISON OF PRESENT TEST AND RESULTS OF PICTURE TEST.

In Graph II a comparison is made, in terms of percentages, between some of the results of the present test and of the earlier picture test. The horizontal numbers show the ages of the girls and boys ; vertical numbers the percentages; on the right-hand side some comparative averages are given (A-D.). The reading of the curves is as follows :

*Curve A*1.—The picture test averages of 2,038 boys and girls in English elementary schools, continuation schools, and clubs (as tested by myself).

*Curve A*2.—The picture test averages of 340 girls from the Black Country high school described on page 164 (as tested by myself).

*Curve B*1.—*The Listener* test averages of all the elementary school boys and girls combined.

*Curve B*2.—The *Listener* test averages of all the secondary school boys and girls combined.

Curve 1.—The *Listener* test averages of the two private girls' schools (Curve 1 on Graph I.)

Curve 2.—The *Listener* test averages of the Black Country school. (Curve 2 on Graph I.)

Curve 3.—The *Listener* test averages of the private girls' school. (Curve 3 on Graph I.)

The first thing that strikes the eye is the broad similarity of the general direction of the three main curves A1, B1, and B2 ; the second, the much higher level of taste shown in regard to household and domestic objects as compared with " fine arts." In the picture test all values but æsthetic values were, in so far as this is possible, eliminated. The test material consisted of four contrasted pairs of illustrations—two of the " Madonna and Child"; two landscapes with trees; two animal studies with landscape backgrounds; and two decorative designs of peacocks affronted. These illustrations had been submitted, as in the *Listener* test, to a similar number of well-known experts who again were in complete agreement as to their relative value. As the graph shows, the children's choices revealed, not a liking of true art, or even a 50 per cent indifference or randomness of choice. A positive dislike of æsthetic value is apparent. The bad, the sentimental, the photographic were signalled out in place of the good, the sincere, the imaginative. So general is the influence of modern industrial life, so widespread its ugliness, so debased the taste of to-day, that the child has no chance. Its natural preference for the familiar becomes a preference for the material and the discordant. The same test, applied abroad, showed that the further the child was removed from industrialism, the greater was its understanding of the beauty of art. The hopeful aspect of the situation is revealed by Curve A2. When the test was given, the girls whose averages are here represented were taught, from about nine onwards, by Miss Richardson. Her teaching, with its stimulation of the intuitive elements in design, had revealed to her pupils, through the medium of their own imaginings, something that they could recognize in the great art of the past. In choosing the better things they no longer chose the unfamiliar and the relationship was direct. No detachment was needed to discover the virtues of vision and harmony shaping arts of another kind.

It will be seen that the girls from this school, until the age of 16½, did better, on the whole, in the *Listener* test than the average girls of other secondary schools, in spite of the lowering of the level of taste from 11-13, due to the influx of elementary scholars. The further drop at 15-17 is probably due to enforced concentration on other types of mental work in connection with school certificate examinations. At 17 these examinations are over and insistence on perspective and technique as an end, rather than a means, is no longer held necessary. The level of taste rises once more. A similar drop from the 16th-17th years, attributed to the same reason, is apparent in the picture test averages of this same school, although no reason has been suggested for the rather later date of its setting in.

As a commentary on the averages of the picture test, four further averages arising from the same test, but obtained from other sources, are given. Point A on the left horizontal line of the graph represents the averages of thirty women in an English gaol; Point B those of sixty-five members of the British Psychological Society; Point C those of thirty boys from a remote village in Cyprus; and Point D those of thirty men and women of wide education whom I happened to meet while carrying out the test. Only a few were professional artists or critics, but all were travellers, readers, or lovers of music.

IV.—BOYS' AND GIRLS' PREFERENCES AND CRITICISMS.

We must now turn to the comments made by the girls and boys in answer to Question VII of the questionnaire. Preferences, on the whole, fall into four broad groups. Objects are liked or disliked (1) for their "shape," "design," "appearance," and for the presence or absence of the various elements in design; (2) because fashionable or unfashionable, common or uncommon, antique or modern, "homely" or unfamiliar; (3) because "plain" or fancy"; (4) because more or

F6

less useful. But there are many preferences and criticisms which cannot be included in these categories, among them those based on a great variety of associated ideas and subjective experiences. The comments of Group I, relating to the true subject matter of art, are not so common as those of the other groups, but they are often of great interest. They reveal genuine sensibility to æsthetic values and should give the teacher ground for much hope. The criticisms and comments of the younger children are often surprisingly just and suggest an imaginative insight which their actual choices may fail to reveal.

The most popular of all the good objects is the wine-glass, closely followed by the good jewel and the good armchair. The most unpopular of them is the embroidery and the severe two-handled jar and coffee-pot. The intermediary group contains the bookcases, teapots, and voiles. It is amusing to note that " Victorian " is frequently used as a term of abuse.

The following quotations are chosen to illustrate a wide field of attraction and dislike, penetration and insensibility. The comparisons that provoked the most interesting comments are treated at greatest length. Prominence is given to comments relating to æsthetic values.*

BOOKCASES.

The finely-designed early eighteenth century bookcase is admired by a large proportion of the older girls and boys of the secondary schools because of its " dignity " and its " pretty pattern." It is admired " because the rectangular shape is more fundamentally beautiful and appeals by its simplicity " (B.S., 18) ; " because it suggests peace and quiet for reading " (G.S., 17) ; " because it has no edges and a plain one looks as nice as a lot of fancy work with no use for it " (G.E., 13) ; " because it is more cheerful and nicer than the sombre one " (B.S., 16). A secondary school boy of nine chose it because it is " more grander than the other," while another of ten prefers it for the unexpected reason that " it looks something like a waterfall and looks as if you could put it into your bedroom." It is often disliked because it is too " plain " and the books cannot be seen. The ugly bookcase is much admired by most of the elementary children to whom, no doubt, the type is familiar, and also by a large proportion of the 11-13 year olds because it holds more, looks stronger, displays the books better, and is " shiny." " I like it because it is smarter " (B.E., 14) ; " because it magnifies strength and everlasting " (B.E., 14) ; " because it looks so cheery and not so musty "

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* References in brackets are as follows : B=boy ; G=girl ; S=secondary education ; E=elementary education ; the numbers represent the ages of the boys and girls.

(B.E., 13) ; " because it is like the old-fashioned furniture we see on the pictures " (G.S., 12). It is repeatedly chosen because it is " more fancy " than the other, and because " the rounded parts give a more stately appearance " (B.S., 16). One girls dislikes it because " it looks as if it belonged to a boarding house " (G.S., 18) ; and another because " it is like a kitchen dresser " (G.S., 15) ; another " because it is too clumsy " (G.S., 14) ; and a boy dislikes it " because it would not suit our family purpose."

ARMCHAIRS.

The fine design of the Queen Anne arm-chair is generally recognized. It is liked because it is " graceful and not top-heavy " (B.S., 15) ; " has a cleaner design " (B.S., 17) ; because it has " grace and substance " (G.S., 18) ; " it is more stately " (G.S., 11) ; " because the decorations are really part of the chair, while on the other they are superfluous " (B.S., 14) ; " because it has lovely design and restrained decoration " (B.S., 14). It is also liked by a secondary school boy of nine " because it reminds me of Queen Victoria, although I think they both looked wicked."* The poorer chair is disliked " because it looks daft " (B.E., 8) ; " because it is only a collection of shapes arbitrarily made into a chair while the other is a real chair shape " (B.S., 17) ; " because it is gaudy " (B.S., 11) ; " because the legs don't look safe " (G.S., 13) ; " because it has a superior look " (G.S., 13) ; " because it is meant only to be looked at " (G.S., 16) ; " because it has rickety-rackety legs " (G.S. 11). In general, the chairs are judged from the point of view of either shape or comfort. Little children choose sometimes one, sometimes the other, because it is " comfy." A seven-year-old prefers the ugly one " because my teddy bear could sit on the top."

COFFEE POTS.

Most of the children dislike the " plainness " of the better coffee pot and are attracted by the curves of the less good example. Only one observer, a secondary school girl of 16, mentions the faulty rhythm of the parts. " The spout does not fit the pot. In the other it does," she remarks. The better pot is liked because it is " more stately and more simple " (B.S., 17) ; " quietly designed " (G.S., 12) ; " because it has less fancy work and is easier to clean " (B.S., 15) ; " because you could use it as a cup for sports " (B.S., 10) ; " because it is very antique " (G.S., 13). A boy (S., 16) says : " The dome impresses me—rather saintly " ; but a girl (S., 13) dislikes it " because it is like a lighthouse." The other pot is liked because " not so like a milkcan " (B.S., 13) ;

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* Did he mean to refer to the other chair ?

"more aristocratic" (B.S., 11); "more embroidered" (B.S., 13); "smaller and neater on the table and where the handle joins there is a very neat finish" (G.E., 12). A boy of seven likes it because "it has such lovely curly sides," and a girl of the same age "because it is all over do-das," but a secondary school girl of eleven condemns it as "too figitty." A child of five approves of both pots "because they are both like ostriches." One girl (S., 13) likes the poorer one "because it looks more profitable"; a little girl remarks: "I like it where it goes fat at the bottom."

TWO-HANDLED JARS.

The terribly ornate jar intrigues the children and criticism of it is rare before the sixteenth year; then it is frequently condemned as "definitely vulgar," "top-heavy," "over-elaborate," etc. Nevetheless, the younger children can also be critical. "The Victorian picture is ghastly" (B.S., 11); "too rich" (B.S., 8); "too lofty and stickly" (B.S., 10); "I don't like it because it looks mad," writes a small boy of seven. The uselessness of the handles and the difficulty there would be in gripping them is also mentioned. Some of the vases' most painful characteristics are unwittingly described by children who like it "because it is much fancier and more like an ornament" (G.S., 13); "because it is more respectable" (G.E., 7); "more gentil" (G.E., 13); "has more appearance than the other" (G.S., 12); "gives a grand exhibition of craftsmanship" (B.E., 14). A boy of four sums up its attraction for all small children: "I like it because it has a picture on it and also trimmings," while a girl (S., 13) delights in "the gorgeous shapes patterned out"; and another (S., 12) in "the mysterious picture which is nicer than abstract design."

The false idea of art, divorced from use, is, unfortunately, already in evidence. The good jar is chosen for its useful properties alone, the bad one as an ornament. The latter is admired, because "it is more pretty and has more art" (G.S., 12); and "is most likely worth more money" (B.S., 12). The good jar is chosen because it is "a simpler and beautiful pattern" (G.S., 13); "bolder" (B.S., 8); "the width is just right for its height" (G.S., 16); "is a better shape and the two handles are more fashionable" (B.E., 9); "because it might be a very old relick" (B.S., 13); "more fascinating" (G.S., 12), and by a boy of seven "because it has not got those long curly things up the sides." One girl of seventeen votes for the bad jar "because I hate the nakedness of the other"; a boy (S., 13) admires the good one "because not so fancy-doodle," while a girl (S., 16) chooses it "because it looks as if it were made by an ancient Britton."

VOILES.

About 50 per cent of the children choose the good voile. The reasons given are generally the same: "less dull," "less monotonous," "less common," "not so standing out," "more interesting," "less uniform"; it is liked "because the designs work easily together" (B.S., 14); "not so solemn and monotonous" (B.S., 11); "has a better variety" (B.S., 12); "individual as compared with mass-produced effect" (B.S., 18); "is restful, the other hurts the eye" (G.S., 17); "more dainty and has a much freer pattern. I should not get tired of it" (G.S., 13); "it reminds me of flowers, and trees, and summer" (G.E., —); "has not the appearance of cheapness that the other has" (B.S., 17); "rather less bestial than the other" (B.S., 18); "more artistic and not so standing out" (B.S., 12); "has more freedom about it" (B.S., 16); "is not so like a lavatory wall paper" (B.S., 13); "has more difference in their colours" (B.S., 14); "because it has a lot of pretty colours" (B.E., 9); "has more lively colours" (G.S., 12); "because it pleases the children on pinafores and other things" (G.S., 13); "because it has one pattern on it with lace running through it" (G.E., 12). It is disliked "because it is rather like seaweed" (G.S., 12); "because it is not so common as the other" (G.S., 12); "because too straggaly" (B.S., 11); "jumbled" (B.S., 13); "muddled" (G.S., 7); and for the charming reason that "you can see tigers and lions in it" (B.E., 8). The worse voile is liked because "not so fantastic" (B.E., 13); "outstanding, plain, and bright" (G.S., 15); "because spots are the fashion" (B.S., 16); "because more restful and systematised" (B.S., 16); "because it has not got too much fancy pattern and so it would not spoil when it was washed too much" (G.E., 11). It is disliked because "too matter of fact. It looks like dominoes, and dominoes are ugly things" (G.S., 12); "it is too familiar and repeated too often" (B.E., 14); "too like a farmer's handkerchief" (B.S., 16).

EMBROIDERIES.

The embroideries occasioned some of the most interesting criticism. Many of the small children and older boys and girls preferred the good one, but the majority voted for the Victorian piece. Sometimes the little children show much discrimination. "I like F1 best (the good one), but F2 (the poorer one) is best for the nursery" (G.S., 8); "F1 is the best pattern but F2 is a dear little girl" (G.S., 8); "I like it (the good one) because it is more of a pattern" (B.S., 8); "I like the shape of it" (B.S., 6); "I like it because it is not so obvious" (B.S., 8); "It would look nice on a chair. I do not like that little girl on a chair.

It does not seem right" (G.S., 7). It is liked "because they had a good idea and have shown it up well" (G.S., 12); "because it is less crudely expressed" (B.S., 15); "better composition" (B.S., 16); "quieter and more suited to its job" (B.S., 16); "because it has a more soothing effect" (B.S., 15); "because it wants more thinking out than the plain one; it seems a Chinese design" (B.S., 14); "because it is more mixed up than the other" (B.S., 14); "because it makes you look hard before they understand it. It is made in curves to suit the picture" (B.E., 14). "because it is calm and peacable" (G.S., 14); "because it is a particularly interesting picture of a shepherd" (G.S., 13); "because it is less self-consciously righteous; I hate that little boy" (B.S., 16); "much more beautiful and does not look coarse and like a crossword puzzle" (B.S., 16); "because there is more of a story in it" (B.S., 14); "because an unconventional picture. You would not get tired of it" (G.S., 16); "because it makes you think summer is here" (G.S., 13). It is disliked because it is "too intricate to be diciphered" (G.S., 15); "squashed up" (B.E., 7); "because it is like nothing on earth" (G.S., 14); "because it is a muck" (B.S., 13); "because it is too vague and futuristic" (B.S., 16); "because there is too much Einstein* about it for my taste" (B.S., 13); "because it is a bit bleury" (B.S., 11). The worst embroidery is chosen because "it is natural and clear" (B.S., 15); "a recognisable pattern" (B.S., 17); "the design is vastly more superior and destincked" (B.S., 12); "it is a more human design" (G.S., 15); "a plainer pattern and nicer for children" (G.S., 13); "more affectionate looking" (B.S., 14); "because it looks very sweet and good" (B.S., 12); "because it gives you a description of a figure" (G.S., 13); "because it makes a good resemblance to Chaucer reading" (B.S., 13); "because it reminds me of a happy summer day reading a shilling book under the shade of an oak tree" (B.S., 12); "because the little boy looks English" (G.E., 13). It is disliked by one good critic "because the artist is trying to imitate from real life and the materials and medium do not make a good imitation possible. The other is a design and the impossible is not attempted" (G.S., 16).

WINE GLASSES.

These are nearly always liked and disliked for the same reasons. The better is preferred because of its good proportions, grace, and simplicity, the worse criticised for its clumsiness, heaviness, and bad proportions. About 90 per cent of the votes are cast for the good glass, which is the most popular of all the good objects. This is encouraging, as the harmonious relationship of the parts is obviously the deciding issue, so much so that only two children mention the cutting of the glass on the poorer glass, one describing it as " too swanky " (B.E., 10). It is sometimes preferred as " antique," but on the whole it gets scant mention and is described as " too stodgy," " clumsy," " heavy," " too thick in the stem." " The stem gives an effect of grossness " (B.S., 18) ; " the stem and bowl do not blend as they do in the other " (B.S., —). The good glass is chosen because " it is superbly graceful and makes the other seem clumsy " (B.S., 17) ; " it shows delicateness and expertness ; it needs sensitive fingers to lift it and it is well proportioned " (B.E., 14) ; " it is more striking and delicate " (B.S., 16) ; " cleaner shape " (G.S., 16) ; " has a more stately form " (G.S., 13) ; " plainer lines, less fanciwork " (B.S., 16) ; " has a smaller mouth " (G.S., 12). It is also liked for more worldly reasons. " It is more aristercratic " (G.S., 13) ; " finer and more genteel for the table " (G.E., 12) ; and by a boy of seven " because it is like the one we have ices in " (B.E., 7). " I like it because it is shallow and more used at dances," says a girl (E., 11).

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*Presumably Epstein.

JEWELS.

" I like it (the better jewel) because it has two mermaids on the sides." This remark by a child of twelve (G.S.), and a second by a boy of four, are the only mention of the figures on this jewel. This can be taken as the sign of a strange lack of observation and interest, or else as a compliment to the nature of fine design. The figures are felt in terms of form and become a part of the general structure. This better jewel is greatly admired. It is described repeatedly as " simpler " with " stronger lines " ; " not too complicated." It is liked " because it is more neat and understanding " (G.S., 12) ; " is not so messy " (B.S., 7) ; " not so full of seemingly unnecessary work " (B.S., 16) ; " more substantial " (G.S., 13) ; " more jewelery looking " (G.S., 13) ; " less spikey " (B.S., 8) ; " less like Woolworth's " (B.S., 16) ; " looks like a piece of jewelry while the other looks like a handful of child's toys stuck together " (B.S., 11) ; " because it is plainer and the other looks like a Christmas tree " (G.E., 10). One boy (S., 12) prefers it for the odd reason that " it is plain and out of fashion and reminds me of eating stale buns without any sugar on them " (B.S., 12). Another likes it " because it looks most precious to steal " (B.S., 13). A boy of thirteen dislikes it " because it is too blasé—" an amusing description of sophistication. The worse jewel is incessantly described in such terms as " muddle," " all jolted up together," " too much of a conglomeration," " confusing." It is disliked because it " has nowhere where the eye can rest " (G.S., 15) ; because " crushed "

(G.S., 13) ; " has too much in it and if you have too much in it it is ugly " (G.E., 12) ; " because it has got too much fancy stouff all jumbled up " (G.E., 12) ; " because complicated and it takes too long to see everything " (B.S., 12). It is preferred " because it is a 'mix up' " (B.E., 8) ; " a delightful muddle " (G.S., 16) ; and for such varied reasons as the following : " Because it is more religious " (B.S., 11) ; " because it would look lovely on a Bridge cake " (G.S. 13) ; " because you can call it a buccaneer's dream because arms, flags, and jewels are in it. Therefore, in my opinion, it is better " (B.E., 14) ; " because it would look very nice on a gentleman's watch chain who had been in the War " (B.S., 10).

TEAPOTS.

These are almost always chosen because of their "shape " or because common or uncommon, fashionable or the reverse. Unfortunately, to the elementary children, the hideous square teapot is already almost as " natural " and familiar as the more beautiful and older form. But a large number of the youngest children and the older boys and girls like the good pot and describe it as " graceful," " natural," " simpler," " bolder." It is liked because it " has more style " (G.S., 12) ; " is more sobstancial " (B.S., 10) ; " looks more reasonable " (B.S., 13) ; is " a balanced shape " (G.S., 13) ; " because more dressy " (G.S., 14) ; " because of its lovely lines " (G.S., 16) ; its " bigger and better formation " (B.E., 14) ; " better shape and more masterly design " (B.S., 14) ; " more like a proper one " (B.S., 11) ; " because it resembles the Grecian workmanship which is unbeatable in design and marvellously shaped. The other is manufactured. This one is art " (B.S., 17) ; " better proportion. The other is like a lodging-house teapot " (B.S., 18) ; " because I like a kettle best " (B.S., 5) ; " because you can see the dark and light more easily in it " (G.S., 13) ; " because it holds more for a big family. You must have a decent sized pot " (B.S., 13). Another older boy writes : "At first the other, for all its suburban and mass-produced appearance, seems less ugly ; but this one grows on me. The more I look at it the more I am convinced that it is far superior " (B.S., 17). The bad teapot is liked by a little child because it is " silly." It is chosen because " more fashionable " (B.S., 13) ; " homely " (G.S., 13) ; " smarter and more modern " (B.E., 11) ; " rather a pleasing novelty " (B.S., 13) ; " because it is odd " (B.S., 11) ; " cos it's different to mother's " (G.E., 6) ; " smarter and more modern " (B.E., 14) ; " because you see them in cafés " (G.S., 9) ; and because " the other one is too primitive " (B.S., 16) ; and is " truly gruesome " (B.S., 18). It is disliked " because it is horrible because it has no spout " (B.S., 7). But the main concern is generally which pot is more or less " common looking " and the voting is fairly evenly divided. Even the question of the presence or absence of a spout takes second place.

V.—CONCLUSION.

What main conclusions can be drawn from these tests ? First, on the theoretic side, that taste seems to follow a more or less definite development at certain ages. The little child lives the imaginative life. He finds it easier, perhaps, to share to some extent an artist's vision. His power to enjoy good form and colour has not yet been largely overlaid. Then he changes. He becomes materialistic and practical in his demands. Later, his outlook is once more shot through with a fresh outcropping of the imaginative life. The critical sense develops. Secondly, on the practical side, that really good art teaching can, to a great extent, save the child from the influence of ugliness.

The further question arises, one upon which we have already touched. Has light been thrown not only on certain aspects of taste but also on the nature of art itself ? Is it fortuitous that in these tests a measure of correspondence is found at given times between certain states of mind and certain æsthetic values ? Would this be possible if art were a merely subjective affair ? It is, perhaps, in this connection that the evidence is most suggestive and of the greatest value. It is very much to be hoped that the tests will be repeated at intervals of 25-30 years. Should this be done conjecture might be turned into proof.

It is also to be hoped that others will check the evidence here given by independent investigations carried out with the same or with other test material. In particular, enquiries are needed into the taste of young children aged 7-10 and into the taste of youths and girls from 14-18, who have only had an elementary education. It would be illuminating if all the scholars of one very large secondary and one elementary school could be tested, schools where the teaching of art is average rather than exceptional. The resulting curves of taste could then be contrasted with those in the present graphs.*

The trouble with so many tests purporting to deal with works of art and reactions to these works is that the level of the test material is seldom high enough to make the results of value. We get a record of reactions, not to work of art, but to counterfeit works. Further, since the essence of art lies in relationships of a particular kind, complex test material is necessary.

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* Only one secondary school was given the picture test (Curve A2) and its teaching of art was exceptional. I would gladly lend the negatives of this test material to anyone who would care to have fresh prints made and continue the investigation.

It would be interesting if a test of tests could be made. I once undertook such an investigation with Mr. Bullough in connection with his most interesting colour tests* and my picture test. But the results were disappointing. Students classed on the basis of the colour test as showing the highest type of æsthetic sensibility often preferred one, and frequently several of the pseudo works of art in the picture test. But this investigation was carried out with only a comparatively small number of students. Further checking would be necessary to establish reliable conclusions.

Finally, I would like to thank Professor Burt for most valuable suggestions made in connection with this article.

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RÉSUMÉ.

UNE ÉPREUVE DU JUGEMENT ESTHÉTIQUE.

On décrit une épreuve expérimentée sur plus de 6,000 garçons et filles, élèves d'écoles primaires, secondaires, etc. La matière de l'épreuve consistait en neuf paires d'objets contrastés, représentant un exemple supérieur et un autre inférieur du point de vue de la valeur esthétique. On cite les jugements exprimés par les differénts groupes d'âge et de sexe, et l'on démontre aussi l'influence qu'exercent sur le jugement differéntes méthodes d'enseignement, de leçons de dessin, etc. On compare en plus le goût des garçons et des filles avec celui de certains groupes d'adultes et l'on avance la proposition d'une comparaison critique des épreuves.

ZUSAMMENFASSUNG.

EINE PROBE ÄSTHETISCHEN URTEILS.

Ein Test wird beschrieben, den man über 6,000 Knaben und Mädchen an Volks-und Hochschulen usw. gab. Der Stoff des Tests bestand aus neun Paaren entgegengesetzter Gegenstände für den Haushalt; jeder Gegensatz stellte ein besseres und ein schlechteres Beispiel in Bezug auf ästhetischen Wert dar. Die von jeder Alters-und Geschlechtsgruppe gefällten Urteile werden gegeben und die Wirkung verschiedener Arten der Erziehung und des Kunstunterrichts wird auch gezeigt. Der Geschmack von Knaben und Mädchen wird auch dem gewisser Gruppen Erwachsener entgegengesetzt. Man schlägt eine Methode vor, die Tests kritisch zu vergleichen.

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* *See* E. BULLOUGH: *The Perceptive Problem in the Æsthetic Appreciation of Single Colours.—Brit. Jour. of Psy.*, Vol. II.

ANALYSIS OF ABILITIES INTO FACTORS BY THE METHOD OF LEAST SQUARES.

BY C. SPEARMAN.

THIS method, as is well known, consists in reducing to a minimum the sum of the square discrepancies between different measurements of the same objects. And to obtain this minimum, use is made of differential calculus in the following manner. In order that the function $f(x)$ should have a maximal or minimal value corresponding to the value x_0 of x, it is necessary and sufficient that the first of the derivatives of $f(x)$ which is not annulled for $x=x_0$ should be of even order. Then there will be a maximum or minimum according as the value of that derivative for $x=x_0$ is negative or positive. After this fashion the operator simply equates the first derivatives to zero, solves for the variables, and then rests content.

Now I would suggest that this operation is often carried out in a blind mechanical manner, with little regard to what is really being effected. All that the preceding differentiation does is to determine the *turning point* (or points) in the curve traced out by $f(x)$, where it changes from falling to rising. Such a point does indeed constitute a minimum of a particular kind: that is to say, with reference to the parts of the curve lying close on either side of it. But this kind is not always required. Many curves do not possess any such turning point and still—unless infinitely long—must certainly have both an absolute maximum and an absolute minimum value.

The importance of this matter may best be seen in an actual example. Recently an interesting endeavour was made by Truman Kelley to introduce the method of least squares into the factorization of scores obtained at mental tests.* First he obtained a preliminary factorization by means of the tetrads devised in the theory of Two Factors.† But then he gave to these factors a final adjustment by the method of least squared discrepancies between, on the one hand, the correlations resulting from the proposed theoretical factors and on the other the correlations actually observed. In this manner he reduced these discrepancies to very small magnitudes. As a matter of fact, it would not be difficult to bring them down to zero.

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* *Crossroads in the Mind of Man*, 1928, p. 99ff.

† That is to say, he "secured an idea" of the non-general common factor in each pair of variables a and b from the mean positive value of the tetrad $r_{ab}\,r_{pq} - r_{ap}\,r_{bq}$, where p and q stand for all pairs of variables other than a and b. This had long been the usual procedure in our laboratory. *See, for instance*, DAVEY: *British Journal of Psychology*, 1926. Indeed, the whole usage of tetrads is derived from our fundamental theorum: $r_{ap}/r_{aq}=r_{bp}/r_{bq}$. *See Abilities of Man*, p. 2 (4).

But I am suggesting here that all such unrestrained reduction is fundamentally fallacious, and conjures up numerous small factors which have no objective basis.

The case may be presented as follows: Let it be desired to express some set of variables, such as test scores, in some pattern of general, group, or specific factors; for example, as:

$$g_x + S_y(h_{xy}) + s_x\,; \qquad (1)$$

where g is a general factor; h a group factor which x possesses in common with y, and S indicates summation. The correlation between two such variables will, with the usual conventions, be $g_x g_y + h_{xy}h_{yx}$. Then, denoting by r_{xy} the *true* correlation between x and y, we may regard as the theoretical misfit of the pattern:

$$r_{xy} - g_x g_y - h_{xy}h_{yx}. \qquad (2)$$

We have to minimize the sum of the squares of such misfits, as to get: $S_{xy}(r_{xy} - g_x g_y - h_{xy}h_{yx})^2$, or for brevity $S(M^2_{xy})$ to be made a minimum (3)

At this stage in the proceedings nothing could be easier than to differentiate and equate to zero for each factor, thus obtaining as many equations as there are unknowns, so that an exact solution is possible. And the minimum would be of the absolute species, as required. Unfortunately, however, the true r_{xy} is unknown to us.

We must then proceed differently, and replace r_{xy} by $r^1_{xy} - e_{xy}$, where r^1_{xy} is the correlation as actually observed whilst e_{xy} is its sampling error. The quantity to be minimized then becomes:

$$S_{xy}\,(x^1_{xy} - g_x g_y - h_{xy}h_{yx})^2 + S_{xy}\,(e^2_{xy}) - 2Se^2_{xy}\,(r^1_{xy} - g_x g_y - h_{xy}h_{yx}) \qquad (4)$$

If in the term on the right of (4) we replace r^1_{xy} by $r_{xy} + e_{xy}$, and take the e's to be uncorrelated with g and the h's, then the term on the right of (4) becomes $2S_{xy}(e^2_{xy})$, so that finally we arrive at:

$$S_{xy}(M^{1\,2}_{xy}) - S_{xy}(e^2_{xy}) = \text{minimum}, \qquad (5)$$

where M^1 stands for the misfits between the correlations derived from the proposed factors and the correlations *actually observed*. But if this time we again apply the differential method, we only get a minimum of the turning-point species. To obtain the required absolute minimum the sum of these misfits should *not* be reduced as much as possible, but should only be brought down to the value of the sum of the sampling errors of the correlations. This, of course, is given with their so-called probable errors.

The considerations of the preceding article seem to admit of wide extension. So far we have only been regarding the influence of the sampling errors on factorization by the method of least squares. But an analogous influence may be expected from factorization by other methods that involve minima or maxima. Here would seem to come the factorizations proposed by Thurstone* and by Hotelling.†

RÉSUMÉ.

L'ANALYSE EN FACTEURS DES APTITUDES PAR LA MÉTHODE DES PLUS PETITS CARRÉS.

Dans les sciences naturelles on se sert beaucoup du principe que le système le plus probable des valeurs des quantités observées est celui qui réduit au minimum la somme des carrés des erreurs. Et l'on vient d'appliquer ce principe au problème de déterminer la meilleure méthode d'analyser en " facteurs " les mesures des aptitudes. Cet article démontre que cette application peut comporter, et a déjà comporté, de graves erreurs, et il indique un procédé plus exact.

ZUSAMMENFASSUNG.

ZERLEGUNG DER FÄHIGKEITEN IN FAKTOREN DURCH DIE METHODE DER KLEINSTEN QUADRATE.

In der Wissenschaft macht man viel Gebrauch von dem Grundsatz, dass das wahrscheinlichste System der Werte beobachteter Quantitäten dasjenige ist, welches die Summe der Quadrate der Fehler als Minimum darstellt. Und man hat diesen Grundsatz neulich angewandt, um zu erfahren, wie Masstäbe der Fähigkeiten am besten in Faktoren zerlegt werden können. Obiger Artikel zeigt, dass diese Anwendung sehr irreführend sein kann und in der Tat oft gewesen ist, und er deutet ein zuverlässiges Verfahren an.

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* *The Theory of Multiple Factors*, 1933; *also, A Simplified Multiple Factor Method*, 1933.

† *Journal of Educational Psychology*, XXIV, 1933, pp. 417 and 498.

AN INTRODUCTION TO SO-CALLED MOTOR PERSEVERATION TESTS.

By W. STEPHENSON

(*From the Psychological Laboratory, University College, London University*).

I.—*Introduction.*
II.—*Types of ideo-motor p-tests.*
III.—*Theories of p-factor.*
IV.—*The theory of continuance and hindrance effect.*
V.—*The theory of extraneous mediation of w-characteristics.*
VI.—*The theory of intrinsic " will " function.*
VII.—*Mental " set," secondary function, and introversion-extroversion.*
VIII.—*Quality-quantity disturbances.*
IX.—*Tests for application to school children.*
X.—*Summary and conclusion.*

I.—INTRODUCTION.

TESTS of the kind, *Colour Fusion*, and *Flicker* (tests of sensory persistence), and *writing* SƧ's, △▽'s, etc. (tests of hindrance effect), and estimates of perseveration,[*] are known to intercorrelate. The intercorrelations satisfy the tetrad criterion, and therefore given evidence for a common factor,[†] which, as is well known, is called "p." To be non-committal we call these various tests p-tests, and their scores p-scores.

It is a matter of great interest that these tests correlate with estimates of the character and general conduct of individuals, so far as this is estimated and measured by Webb's w-factor.[‡] Lankes[§] found that p-score correlated negatively with estimates of the kind supplying w-factor. More recently Pinard,[**] Howard,[††] Cattell[‡‡] and others have shown that the correlation between p-score and w-estimates is non-linear, the general trend still being negative. That is, the unreliable, untrustworthy, and " difficult " or " problem " child (presumably of low w-character), tends to score either extremely high-p or extremely low-p in p-tests. The child of well-balanced conduct (of good w-character) tends to obtain an intermediate p-score.

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[*] The estimates have included the frequency with which tunes, ideas, etc., come to mind recurrently, or, again, the ease or difficulty with which an individual adapts himself to a new situation. Some children, at the conclusion of one school lesson, cannot accommodate themselves freely to a new lesson.

[†] *See* SPEARMAN, C. : *The Abilities of Man.* (MacMillan, 1928.)

[‡] WEBB, E. : *Character and Intelligence.—British Journal of Psychology* (Monograph Supplement, I, 3).

[§] LANKES, W. (1915), *Perseveration.—British Journal of Psychology*, VII, p. 387.

[**] PINARD, J. W. (1928) : Thesis, University of London Library.

[††] HOWARD, C. C. (1930) : Thesis, University of London Library.

[‡‡] CATTELL, R. B. (1933).—*British Journal of Psychology* (General Section), Vol. XXIII, p. 308.

But to set against these results there have been criticisms that p-tests are unreliable, and that they either fail to intercorrelate or their intercorrelations are too small for serious regard. There are psychologists who, frankly incredulous, wonder how a simple activity like writing S2's can possibly make contact with the profound qualities and subtle nuances of character. There are others who pour scorn on the fact that p and w correlate negatively when, according to theory, the two were expected to correlate positively.*

It is the object of the present paper to bridge the gap between these two sets of findings. We believe that p is a factor of some interest for both general and educational psychology, and that an introduction to its facts, problems, and theories might be welcome. In the present paper we are to discuss the so-called " motor " tests of perseveration. In a paper to follow the present one, norms, correlations, and validation data will be reported. These introductory papers, together with others to appear elsewhere, should supplement the chapter on p-factor in Professor Spearman's *Abilities of Man*.

II.—TYPES OF IDEO-MOTOR P-TESTS.

P-factor is measured, for the main part, by use of " motor " tests like the *writing* S2's, and *triangles*, of Bernstein.† These, for reasons to appear in the sequel, we prefer to call ideo-motor p-tests. All are capable of application by group testing methods. It is convenient to distinguish between three types of these tests. Type A involves rapid alternations or switching, Type B is concerned with a breaking away from well-habituated activities, and Type C involves a newly-instituted mental " set."

In Type A the perseveration effects are looked for in the rapid switching from one activity to another closely resembling it, as in the sample following :

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* This matter is discussed in a paper forwarded to the General Section of the *British Journal of Psychology*.

† BERNSTEIN, E. : *Quickness and Intelligence.—British Journal of Psychology* (Mon. Supplement, III, 7).

The Writing S Test. Type A.

(a) Writing S S S S .... 1 minute.
(b) ,, Ƨ Ƨ Ƨ Ƨ .... 1 ,,
(c) ,, S S S S .... 1 ,,
(d) ,, Ƨ Ƨ Ƨ Ƨ .... 1 ,,
(e) ,, S S S S .... 1 ,,
(f) ,, Ƨ Ƨ Ƨ Ƨ .... 1 ,,
(g) ,, S Ƨ S Ƨ S Ƨ S .... 3 minutes.*

The S's in this test can be replaced by Z's, triangles, small letter e's, etc. If the total number of letters written in the six minutes from (a) to (f) is X, and the number written at (g) is Y, then p-score could be $(X-2Y)$ or $X/2Y$, or some such value. The score then allows for the difficulty *per se* in writing reverse letters as at (b), (d), and (f), because, if the rapid switching at (g) does not involve an additional or special difficulty, then X should equal $2Y$ approximately.

In Type B Tests the hindrance influences are expected in the difficulty that is experienced in breaking away from an old activity. The Downey Test of disguising one's handwriting and the "*it*" test, the *backward writing, mirrorwise drawing, writing numbers with reverse strokes,* and similar tests of Bernstein are further examples. A sample is as follows:

Writing Numbers Test. Type B.

(a) Writing the numbers 34567 as quickly as possible over and over again................................ 2 minutes.
(b) Writing the same numbers, but with reverse strokes, commencing each number where it is customary to end it. The "3," for example, is written from below upwards. ....2 minutes.

Again, if the number of figures written at (a) is X, and the number at (b) is Y, then p-score may be $(X-Y)$, X/Y, or some such value.† In this case we observe there is no compensation for the difficulty *per se* of the reverse writing. If the tests supply p-factor saturation,‡ then the mere difficulty in writing reverse numbers, relative to the ability to write them in the normal way, is indicative of perseveration, if p-factor is explicable in terms of perseveration.

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* A rest of half a minute is allowed between each of these parts (a) to (g).

† The indiscriminate use of X/Y is to be deprecated; it gives logarithmic distributions, and usually introduces "spurious" correlation. The ratio, however, has certain advantages. It is easier to validate it.

‡ By p-saturation is meant the correlation of the test with a perfect measure, hypothetical, of p-factor.

Tests of Type C we name " direct " p-tests. They have been worked over in general psychology by Cathcart and Dawson,* without, of course, measuring individual differences. A sample test is as follows :

Cancellation Test. Type C.

(a) The subject cancels the letters X, O, I, from a sheet of mixed letters for three minutes.
(b) The subject now cancels T, L, I for three minutes.
(c) Cancels T, L, I for three minutes.
(d) Cancels X, O, I for three minutes.

In tests of this type the attempt is made to have the activities at (a) and (b) identical in difficulty, or to correct for any difference in difficulty by interchanging the activities as at (c) and (d). Hindrance effects are anticipated due to the mental "set" of the activity at (a) acting as a disturbance in the subsequent activity at (b), and likewise in (d) resulting from the mental "set" of (c). The high perseverator, it is expected, tends to cancel X's and O's at (b) instead of T's and L's, and similarly T's and L's at (d) instead of X's and Q's. A simple test of this kind is given as No. 7, later, for young children.

It seems, however, that the cancellation test does not supply p-factor saturation if the activities at (a) and (b) are equally difficult.† The test only measures p when the activity at (b) is of itself more difficult than that at (a). Thus, if the cancelling required at (b) were H, G, V, N, then p-factor correlations would probably accrue in terms of this ability as Y-score, and XOI cancelling as X-score. It is then immaterial which cancelling is done *first*, the XOI or the HGVN. A fact of this kind suggests that, since the test supplies the same kind of p-saturation as tests of Types A and B, there can be nothing essential for p-measurement in either the similarity of the activities in the alternating parts of tests of Type A, or in the breaking away from old activities as in tests of Type B. On the other hand, it is certain that tests which involve a well-habituated activity, alternated with a similar but new activity, provide higher p-saturations on the average than any other type of test.

III.—THEORIES OF P-FACTOR.

It is usually considered that p-tests measure perseveration. Pinard‡ and Cattell§ seem to use the tests with that understanding.

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* CATHCART AND DAWSON (1929-30).—*British Journal of Psychology*, Vol. XX, pp. 262-275 ; and (1930-31) Vol. XXI, pp. 343-356.

† *See* LANKES, ibid., and CATTELL, R. B. (1933).—*British Journal of Psychology* (General Section), Vol. XXIII, p. 308.

‡ PINARD, ibid.

§ CATTELL, ibid.

Originally the word perseveration referred to abnormal recurrences to mind of words, tunes, etc. Thus, Jung gives an example of a man's perseveration of the word "short" to all kinds of stimulus words in an association test. For psycho-analysts, of course, these perseverations have an ideational explanation. In the instance cited the man was actually short in stature, and this, Jung considered, had resulted in a loss of self-confidence. The man became impotent, walked on his tiptoes whenever he was alone, etc. The word "short" therefore stood for many painful experiences, and, according to Jung,* "this is usually the case with perseverated words; they always contain something of importance for the individual." Similarly, one might find oneself humming a tune, Handel's the "Dead March in 'Saul'", at every odd moment of the day. This is a perseveration in the original meaning of the word. In this case, perhaps, the analyst could show that the perseveration was explained by the individual's unconscious death wishes directed against someone or other. The laboratory psychologist, however, has not so far been concerned with these interpretations.†

The term perseveration was later used, by Lankes, to mean also the "continuance, sub-conscious, or even completely unconscious and purely physiological, of the effect of a past experience," as manifested by "the degree of hindrance which the perseverating effect of a past activity causes to a new one of the same kind."‡ Professor Spearman uses the term *general inertia* to cover all manifestations of a persistence kind in the sensory and motor fields, as well as perseveration of ideas, tunes, etc. Some such generalizing concept was necessary, it was considered, because the same p-factor covered all three features. But for Lankes and, presumably, also Pinard and Cattell, perseveration and general inertia would be synonymous terms. What Lankes called perseveration in the ideo-motor tests the present writer prefers to call "continuance and hindrance effect," and we would like to restrict the word perseveration to its earliest usage.

General inertia was also regarded by Professor Spearman as a property of central mental energy.

We believe that to understand the facts gathered about p-tests and p-factor at least four theories require to be considered. It takes all four to explain the facts shown by ideo-motor tests. The first is the theory of continuance and hindrance effect. The second is that p-factor supplies a direct measurement of character qualities in a somewhat extraneous way, the sum, as it were, of many influences which together give the tests their correlation with character estimates. The third theory suggests that the so-called individual differences in continuance effects are better regarded as dependent upon an intrinsic " will " function. The second and third theories mean that not perseveration, but either habitual modes of conduct, or conscious or unconscious control, inhibition, and co-ordination, are the critical processes entering p-tests. The fourth theory is that, frequently, mental " set " explains p-scores.

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* JUNG, C. G.: *Analytical Psychology*, p. 206 (Second Edition).

† The original concept of perseveration is examined in detail in a paper to be submitted elsewhere.

‡ LANKES, ibid. *Also quoted by* PROFESSOR SPEARMAN: *The Abilities*, ibid.

IV.—THE THEORY OF CONTINUANCE AND HINDRANCE EFFECT.

The theory of sensory and motor, or psycho-physiological, perseveration, or of continuance and hindrance effect, is as follows :

It is known that pressure applied to the skin gives a sensation which does not subside immediately the pressure is removed. The sensations persist. This, sensory persistence, is the basis also of colour fusion. In the *Colour Discs* test two coloured sectors, one red, say, and the other green, are rotated until they are perceived as a blended shade of grey. First one sensation, and then the other immediately following it as the disc rotates, has its sensory after-effect. The result is confusion, with fusion as the consequence.

The theory seems quite simple. Yet the processes involved are much more involved. Thus, pressure after-effect (and indeed the whole sensation itself) can be controlled and modified by the individual. Such control is not even absent in a test as seemingly purely sensory as colour fusion.

Tests of Types B and C (Section II) compare, it would seem, with pressure after-effect ; and the switching, in tests of Type A, is a replica of the colour fusion test. But, on further consideration, the ideo-motor p-tests are more complicated than the sensory tests.

Consider, for example, the *writing* SƧ Test. The theory is that the writing of S hinders the writing of Ƨ when the two follow each other quickly as in the alternating writing at (g) of Test A. As in the case of the colour disc, the confusion will be the greater the greater the speed of switching from one letter to the other. It would follow, therefore, that the individual who attempts to switch too rapidly places himself at a decided disadvantage. It is considered that the thoroughly habituated S-writing, a co-ordinated neuromuscular and ideational activity, has after-effect, and that this disturbs the Ƨ-writing immediately following it. But, in addition, the Ƨ-writing is a *new* activity, which is somehow *similar* to the S-writing. These two features are specifically mentioned by Lankes, and appear to be somehow peculiarly efficacious for p-measurement. In cases of extremely great hindrance effect (as seen in certain præcox cases) switching is impossible, the mere similarity and newness supplying an insuperable difficulty. Again, p-factor does not enter significantly into tests in which switching takes place between two equally well-habituated activities.

It is of interest that Pavlov* in his theory of conditioned reflexes arrives at theoretical statements which can be paralleled, detail for detail, with those for p-tests. It was left by Pavlov, as a problem for future research, to determine what occurs when, having instituted a conditioned reflex, a new stimulus is given which closely resembles the older one, and yet requires a new response. P-tests meet with the same problem, as we have shown elsewhere.† and appear to have solved it long ago. In the present paper it is sufficient to say that a formula has been given‡ along the lines of Pavlov's theories of inhibition, to describe p-tests. For the *writing* SƧ test the formula would be :

$$\begin{gathered} \text{A} \longrightarrow \text{S.} \\ (\text{A}+\text{a}) \longrightarrow \text{Ƨ.} \end{gathered}$$

In this formula A is the idea in mind (if we may be pardoned by reflexologists for mixing ideational notions with reflexological patterns) to write the old activity S ; (A+a) is the idea in mind to write the new activity Ƨ. Each equation amounts to a stimulus-response pattern. The more (A+a) resembles A, the greater, theoretically, will be the difficulty in performing the new activity. Thus, when the letter Ƨ is being written, if the idea in mind is that of writing a reverse S, the operation is difficult ; but if the Ƨ is thought of as a shape in itself, a "pot-hook," say, then the writing is done with ease.

In the light of the above theory we can understand, perhaps, why tests like *writing* SƧ, *triangles*, and *writing* ZΣ are usually less saturated with p-factor than the *writing e* test (in which a small letter *e* and a reversely written *e*, written from below upwards, have to be alternated). The *writing* SƧ test is open to the spoiling influence of helpful ideas in mind (the "pot-hook" shape, etc.), and neither the △-shape nor the Z-writing are thoroughly habituated for many individuals. On the other hand, the *e*-writing is firmly implanted, and it is difficult to think of a reverse *e* without at the time having the idea of a normal *e* in mind. Along such lines we can perhaps understand why the *writing* SƧ and the

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* PAVLOV, J. P. : *Conditioned Reflexes.*—Oxford U.P. (1927).

† STEPHENSON, W. (1932) : *P-score and Inhibition for High-p Praecox Cases.*—*J. Mental Science* (London), October, 1932.

‡ STEPHENSON, ibid.

triangles tests (which many workers on p-tests have, unhappily, chosen as fully representative tests) frequently fail to correlate.

In tests of Types B and C it must be supposed that the after-effect of the " set " or habituated activity persists for some time, hindering the new activity even though it does not follow immediately upon the old one. But it is anticipated that after-effect will be at a maximum immediately after occurrence of the habituated activity, and that, therefore, tests of Type A should measure hindrance effects under optimum conditions. On the other hand, the theory of similarity and newness given in the above formula could apply equally well to tests of Type B, leaving only tests of Type C to be dependent upon long-range after-effect. In our experience tests of Type A have higher p-saturation than tests of Type B; the parts (b), (d), (f), of Test A themselves have p-saturation, being, with respect to the normal activities, just like Type B tests; and we have yet to find p-saturation in any pure tests of Type C. The facts, at first sight, seem to support the theory of after-effect and its rapid decay with lapse of time.

The above, then, are some of the influences which enter, theoretically, into ideo-motor p-tests. Throughout, the theory relies upon a process which, once it is set going, persists and only gradually decays. It is this that causes the hindrance, the persistence being either neuromuscular, psycho-physiological, or ideational. The persistence, furthermore, is regarded as a property of the total activity, so to speak, in its own right, like the persistence and gradual fall in the temperature of boiling water lifted from a fire and set to cool.*

V.—THE THEORY OF EXTRANEOUS MEDIATION OF W-CHARACTERISTICS.

The second, as well as the third, theory for p-factor, the one of fortuitous or extraneous, and the other of intrinsic, mediation of " will "-like processes, both start from the fact that p-scores correlate with estimates of character qualities. That the correlation is negative and non-linear is just as important as it would have been had the correlation been positive and linear.

If two measurements like p and w correlate, the questions arise: are they measurements of the same, or different, things? And, if different, how is the correlation to be explained?

Lankes considered that p and w were essentially measurements of different things, and the Spearman School has up to now retained this viewpoint. But Lankes had also to conclude that the individual of high w

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* The temperature fall, of course, really depends on the surrounding temperature conditions.

(of good control and co-ordination, etc.) could modify and change his own native tendencies to high perseveration. This, it seems to us, is tantamount to supposing that there are no native individual differences in perseveration, so far as they have ever been measured. That is, the high w individual merely disguises his perseveration by effort and will, while the individual of low w retains, without disguise, his same native high perseveration.

It might be thought that perseveration explains character in a fundamental way. An individual with a certain native psycho-physiological constitution would tend to be of an unstable character in one way or another, whilst individuals who are more fortunate in their constitutions would tend to be stable and well-balanced. Perseveration, in this way, would be the explanation of anything that could be called the innate determiner of character. In the same way the excitable and inhibitory types described by Pavlov are considered by him to depend upon certain properties of the cells of the cerebellum.

We do not doubt that deep-down and fundamental explanations of the above kind might reasonably be expected. But, usually, there is a simpler theory at hand to explain correlation between p and w. The individual differences are often indications of character and behaviour, or of features of it, in a direct way, without the intermediary of, or any essential dependency upon, individual differences of a perseverative kind.

The theory of extraneous mediation of character-like qualities calls attention to the need for detailed analysis of the facts represented by a correlation table for p-tests. It is well known that extremes of character traits are estimated with great reliability. In the same way extremes of p-score have greater reliability than intermediate scores. Furthermore, if the correlations between p-tests are low, as they are apt to be, the fact that a few individuals invariably obtain extremes of p-score can account for the correlation. These extreme scores can have a variety of explanations, apart from perseveration.

The theory, however, begins from the observation that Y-activity (e.g., S2-writing) is more difficult than X-activity (e.g., S-writing), and that this difficulty need have little to do with continuance and hindrance effect. An example of this independency has been given for the cancellation test, but others can be given from amongst the other tests used by Lankes and Bernstein, where the difficulty in Y-activity can have perceptual, eductive, memory, and other explanations. P-score, then, has to be regarded as a measurement of the way in which an individual reacts to the Y-activity relative to his reaction to the easier, X, activity.

These reactions to the difficult part can be of many kinds, some crude and others very subtle. But the simplest generalization about them is as follows: The difficulty at Y-activity is not insuperable. It is of just sufficient a degree to allow an individual, by effort and will, to contribute materially to success in it. This, further, is irrespective of the individual's other abilities, his intelligence, memory, perseveration, etc. If he is of high w, or puts forward effort (knowingly or otherwise) in the face of difficulty, then he tends to succeed at Y-activity. If of low w, he stands to fail. In this way p-score and w-estimate correlate negatively.

But explanation as effort put forward is too simple. P-factor, according to the present theory, is to be regarded rather as a matrix of influences which on the whole sum up to w-characteristics. Certainly there are individuals who consider Y-activity to be impossibly difficult and who do not further attempt it. There are diffident and suspicious adults who are quite upset by Y-activity. In passing from class to class in a school, group p-testing readily picks out the " difficult " classes. A ripple of uncontrolled laughter at the difficulties in Y-activity, and remarks of the kind " I can't do it," give away both the secret of a class teacher's habitual weak class control and the inadequacy of the children themselves.* But Y-activity also requires more attending to than X-activity, and, consequently, the well-balanced individual will usually succeed in Y-activity on that account. Again, there are individuals who, when required to work at speed under conditions of great conation, fail egregiously, but succeed if less conation is expended.

In testing a typical so-called introvert, a superior clerk with finely-developed skills and interests, the extremely high p-score he obtained was accompanied by emotional and affective displays of a mild but marked kind. Having lived these same emotions one could, in popular phraseology, sense them. A turmoil of inferiority and shy, inarticulate unhappiness and fretting, this and much more could be observed, and was reported by the testee himself. At the other extreme a woman, equal in skills with the clerk, performed the tasks with evident enjoyment and with the greatest of ease.† It is all too easy to conclude that the unhappiness and fretting in the one case and the self-satisfaction in the other, is due to the failure and the success respectively in the tests. The conclusion, however, would be quite wrong. The p-tests have tapped the clerk's emotional instability, his overruling affective and personal difficulties. P-score is only a representation of these complex psychological pictures.

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* The class teacher can influence, in this way, the p-saturations of the tests, but not the essential individual differences. Interesting points of technique also appear—group testing should not be conducted along military or martinet lines.

† The two individuals were members of a group of thirty adults. They were considered to be extreme cases of introvert and extrovert respectively. It greatly surprised the author to find that they obtained highest and least p-scores respectively of the group.

Influences of the above kind, it would seem, sum up to w-characteristics. But it should be clear that psycho-physiological perseveration is not necessarily an *explanation* of these influences entering p-tests. Thus, the same introvertive clerk could do the p-tests, under other conditions, with a success not less than that attained by the extrovertive woman. A psycho-physiological perseveration, to be basic, could scarcely be so capricious.

We would repeat, however, that continuance and hindrance effects can enter the p-tests. But from the above point of view they are just difficulties to be overcome, and, to judge from the tests used by Lankes and Bernstein, other difficulties are as potent as the so-called perseverative. The difficulty can be the total test situation, as in the case of the introvert above-mentioned, who was upset because he fancied that his ability would be compared with that of others in the group.

But it may be objected that, after all, the clerk *did* in fact display continuance and hindrance effects. This is quite true. But the view could be that, so far as the p-tests were concerned, all individuals are alike in their perseveration, and that what appears on the surface is just what appears under appropriate conditions. When emotionally upset, or under conditions of poor conation, the psycho-physiological effects become observable, much as a Jack-in-the-Box is perceived when the lid is removed.

It is possible, of course, that psycho-physiological perseveration might, as it were, lie at the back of all the above patterns of behaviour. In some deep-down and fundamental way it might explain the psychological features of the introvert and the extrovert, etc. For the author's part, however, he requires to know more about the conditions governing the emotions, affects, and total personality of individuals before this view is accepted. To accept the one as the cause, somehow, of the other, that perseveration explains introversion and w-characteristics, would be like putting ourselves in the place of a meteorologist who spends his time theorizing about the beginning of a wind. He would, no doubt, overlook, in so doing, the pressing business of the depressions, cyclones, anticyclones, etc., that constitute the body of his science. Furthermore, if such fundamental explanations are sought for, then that expressed in the third theory for p-factor is much to be preferred to the theory of perseveration.

Several still cruder influences which enter into p-scores require consideration. Scoring methods alone can be responsible for many anomalies. Thus, the dull child, slow and inadequate, obtains a poor X-score compared with that for a brighter child of the same age, and fails almost completely at Y-activity. A score (X—Y) gives him a low p-score. But X/Y would give him a very high p-score. The dull child may score 11 and 1 and the brighter child 50 and 40 respectively, in the X and Y parts of the tests. Scored as (X—Y) the two are alike, but X/Y gives a score 11.0 in the one case and 1.25 in the other. The dull child is readily estimated as of low w-character. One has, therefore, to wonder how far perseveration enters into the 11.0 score, which, presumably, would be used if p-tests were to be validated on character estimates. How far, too, do such scoring anomalies enter into the non-linear relation that has been observed between p-scores and w-estimates. Again, the older and duller boy, whose skills are well developed because of his age, obtains a high X-score, but fails at Y-activities, and so obtains a high p-score. On the other hand, the well-behaved and energetic child, whose work bears the stamp of non-perseveration, tends to receive an intermediate, or even a high, p-score. It is high rather because his X-score is good than because he fails in any way at Y-activity. Such influences, entering into the mere method of scoring p-tests (some of the questions could not be asked if standard deviation scores are used for X and Y scores instead of crude scores), require consideration before one would freely explain p-scores as measures of continuance and hindrance effects. It is clearly a major problem to decide whether the scale of p-score is a linear reflection of something that could be accepted as a linear scale of continuance and hindrance effect.

VI.—THE THEORY OF INTRINSIC " WILL " FUNCTION.

This, the third theory for p-factor, has already entered in part into the above, the second, theory. In the above case, however, the additional difficulty at Y-activity need have nothing to do with perseveration. In the present case it is supposed that all the tests (as in the list supplied later) involve continuance and hindrance effects in Y-activity, and that they presumably measure those effects. It supposes, further, that extraneous influences (such as those of an emotional kind) have been equalized, and a linear scale for p-effects has been fixed upon. The theory then proposes that the disabilities, and individual differences, measured as p-factor, should not be regarded as due to continuance and hindrance effect of the kind described in Section IV above. On the contrary, it suggests that there are no fundamental individual differences, so far as p-tests are concerned, in continuance and hindrance effect. It proposes instead that it is nearer the facts to explain the disabilities as due to conscious or subconscious control, or lack of it—that is, a fundamental "will"-like process.

We question whether an activity continues because of its continuance effect *per se*, and suggest that it continues only because it meets with no opposition, nothing to stop it from continuing in its previous state. A rolling stone comes to rest due to opposing forces of friction, etc. We look, likewise, for opposing forces which act upon a fundamental psycho-physiological continuance effect.

The theory is not a subtle dilletantism. A direct comparison can be made of some results described by Pavlov,* and others readily observed when p-tests are applied to certain præcox cases, which goes far to support the present theory of "will"-like function. Thus, Pavlov shows that a dog with extirpated cerebellum will continue to react for an indefinitely long time, always in the same monotonous way, to an unconditioned stimulus. If food is shown to the dog, and then removed without it receiving any, and if this is repeated time and time again, the dog will continue all the time to respond with the self-same salivary and food-seeking reactions. A dog with an intact cerebellum, on the other hand, will inhibit these reactions after only four or five repetitions of the somewhat tantalizing stimulus. That is, unconditioned reflexes, in themselves, show complete continuance effect. It is the cerebellum (in Pavlov's words) which adds the inhibitory forces and subjects this unceasing repetition to control. The same repetition can be observed for conditioned responses when inhibitory influences are weak. We find this to be clearly the case when præcox cases (those who are "shut-in" and withdrawn from reality, but yet not completely stuporose) attempt to do p-tests. Thus, a certain patient, a young woman, tried for half an hour to write a reverse letter *e* (written from below upwards).† But at every attempt, and several hundreds were attempted, a normal letter *e* was written instead. In each case the preliminary movements were made for reverse e-writing, but they inevitably "tumbled" into those for a normal letter *e*. What was missing, obviously, was an inhibitory influence, a force to oppose the unceasing continuance or repetition of the well-habituated activity. We name the opposition a "will"-like function. Pavlov would call it inhibition. We do so because the processes entering p-tests in this way are very complex, and are more sensibly regarded as " will "-like—the whole individual being concerned in the inhibitory activity, and not merely a system of subserving inhibitory reflexes.

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* PAVLOV, J. P.: *A Brief Outline of the Higher Nervous Activity*, Chapter II, Part VI, "Psychologies of 1930." (Clark University Press, 1930.)

† *See Test No.* 5. The facts of this kind are reported in STEPHENSON.—*J. Mental Science*, ibid.

Præcox patients who are not so " shut-in " as the patient mentioned above show effects of an equally striking kind. At one moment the patient is able to succeed normally at alternating or reverse writing in p-tests, whilst at the very next moment she is completely at the mercy of continuance effect, and is then unable to write a single reverse letter. Again the attempts are made, but each " tumbles " into the habituated writing. Some time afterwards the patient can succeed quite well again. Again we must conclude that a purely physiological after-effect could scarcely be so capricious in its action. The facts seem best to fit the theory of a process that would continue unceasingly under stimulation were it not for the constraint imposed upon it by something in the nature of a " will " function.

Furthermore, as we are alike in the fundamental frequency of our nerve " action " currents,* so also might we be alike in our fundamental nervous after-effects.

On the other hand, it might be decided that the continuance effect and the controlling influence to which it is subjected, are irreduceably linked together, like the two sides of a mirror. But, even so, both sides should be considered in any theory for p-factor. Because p-score correlates with w-estimates, and for the reasons given above, and because we prefer to emphasize the psychological rather than the physiological processes that enter into p-tests, we place most stress on the theory of a conscious or unconscious controlling and co-ordinating function.

VII.—MENTAL " SET," SECONDARY FUNCTION, AND INTROVERSION-EXTROVERSION.

The theory just considered looks at the facts entering p-tests from a new point of view. But the fourth theory completely inverts the usual theory of continuance and hindrance effect !

There are continuance effects which, far from hindering the alternating or new activity in p-tests, do the very opposite and sustain it. Thus, a pronounced mental " set" is observable in fluent reverse writing, as well as in alternating. The individual feels that he has " got into the swing of it." The new tasks seems somehow different—it has a gestalt-qualitat of its own, and is not the summation of units each comprising a normal and a reverse letter. The mental " set " is introspectible as a continuance, a helping process.

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* ADRAIN, E. D. : *The Basis of Sensation.* (Christophers, 1928.)

Many psychologists, on examining p-tests without any previous p-factor theory in mind, conclude at once that it is this mental "set" which should be called perseveration. The p-tests, they consider, measure the ability to institute and retain a mental "set," and the latter function is particularly critical in Y-activities. The high perseverator, they think, should succeed easily in p-tests. Having begun the alternating activity, his perseveration should make it easy for him to continue, just as a ball, set rolling, continues to roll in virtue of its own inertia. The non-perseverator, on the other hand, would usually fail to institute this peculiar mental "set," much less retain it. That is, the individuals obtaining a *low* p-score (Y ability being nearly the same as X) would be called perseverators. Individuals who obtain a *high* p-score (Y ability being much less than X) would be called non-perseverators.

According to this theory of mental "set," then, p-scores have a significance the very opposite of that hitherto given to them. What Lankes, Bernstein, Pinard, Cattell, and the present writer, have called high p-scores are, according to this theory, indicative of non-perseveration, whilst low p-scores are indicative of high perseveration ! Thus, Lankes's conclusion concerning w and p would have to be reversed. Perseverative function and w-character would be considered to correlate positively, and not, as before, negatively !

With the theory of continuance and hindrance effect, and that of mental "set," in mind, p-scores become not a little enigmatical. Are we to say that high Y ability, relative to X, is characteristic of non-perseveration, a sign of slight continuance and hindrance effect ? Or is it characteristic of high perseveration, a sign that a helping mental "set" has been instituted and maintained ? The individual who finds the *greatest* difficulty in Y-activity (in virtue of continuance and hindrance effect), as well as the individual finding *least* (because of mental "set"), might both be regarded as high perseverators. It would be extremely interesting if it could be shown that this explains the non-linear correlation between p and w reported by Pinard and others.

There are other interesting implications when a comparison is made of the two theories of continuance and hindrance effect and mental "set." For Lankes and the Spearman School, perseveration (as tested) has been regarded as rather a disturbing than a helping influence. This is somewhat opposed to the earlier concepts of after-effect and secondary function, out of which the work of the Spearman School developed. Muller and Pilzecher, Otto Gross, Jung, Heymans, and Brugman considered that secondary function was essentially a helping process. It explained the course of consciousness, its coherence, and orderliness ; it was the process by which mental associations were made possible. It helped one idea, so to speak, to be linked to another by virtue of its after-effect. The after-effect allowed ideas to remain or to reappear before the mind's eye, thereby enabling the individual to elaborate and develop them by working over the reappearing ideas time and time again. The individual with low secondary function, on the other hand, was at the mercy of immediate conditions ; associations could not be made or sustained with ease, and ideas, once having appeared to mind, rarely reappeared by way of after-effect. The theory of mental " set," we suggest, is akin to this of secondary function ; it is a helping, a dynamic, process, whereby activity can be continued once it has begun.

As is well known, the concept of secondary function, or perseveration, with the above meaning of a 'helping' process, was early used as an explanation of introversion. The introvert was supposed to have high secondary function, whilst the extrovert had but little. It explained, or was associated with, the introvert's perseveration of ideas, his complexes, emotions, feeling-tones, etc., especially at the hands of Jung. Now it is interesting that Pinard,* working, we believe, without knowledge of the implications, has found in fact that introvertive characteristics are associated with non-perseveration as measured in the Lankes sense. According to the theory of mental " set " this contradiction is apparent only, and is due to the topsy-turvyism of the p-scores used by Pinard. Regarded as measures of mental " set," in turn a measurement of perseveration, Pinard's results indicate that introvertive characteristics go with perseveration. In this way, then, there is a common core of fact in the studies of Jung, Lankes, Pinard, and others, and apparent differences are merely due to the fact that Lankes and Pinard have been reading their p-scales upside down.

Finally, there may appear to be a contradiction between the picture of a typical introvert given in Section V and that implied in the present section. The clerk, under emotional stress, obtained a high p-score—which, according to the theory of mental " set," would be indicative of non-perseveration, and therefore of extrovertive tendencies. But it has throughout been our contention that the high p-score obtained by this clerk should be regarded as a measure, not of high perseveration, but only of emotional stress. In other circumstances he could maintain a mental " set," and score, accordingly, a low p-score. That is, again, extremes of p-score, either very high or very low, can be associated with introvertive characteristics.

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* PINARD, J. W. (1933).—*British Journal of Psychology* (General Section).

VIII.—QUALITY-QUANTITY DISTURBANCES.

The above sections have served to introduce certain p-tests and the theories that can be put forward to explain the measurements they provide. We believe that all four theories help us to understand the facts that have been gathered by use of p-tests. Thus, we have so far talked of p-factor as though only one existed, the same tangible something observed by Dr. Wynn Jones, Lankes, Bernstein, Pinard, and the present writer amongst others. But, although a common core undoubtedly runs through all these measurements, the various p-factors must be considered to have slight nuances. For this reason the second of the theories, that of extraneous mediation of w-characteristics, probably best explains Lankes's data.* The theories of continuance and hindrance effect, and of intrinsic " will " function, are better fitted to explain the data gathered by use of rather more refined testing techniques and closer observations.

Of the improvements in p-testing, by which, we suggest, a closer approach is made to unequivocable theory, that of removing quality and quantity disturbances is, perhaps, the most notable. Thus, if p-tests are applied on plain paper it is found that wide differences appear in the quality with which the X and the Y parts respectively are written. One individual will write very small and poorly-formed letters in Y-activity instead of the clear and bold writing given as X-activity. Another will change a fluent X-activity into a deliberate and over-scrupulous Y-activity. In all such cases the individual disguises the essential difficulty he experiences in attempting Y-activity. Now differences of this kind are, perhaps, in their proper place in a test which is to be used as an indicator of personal idiosyncrasies, and, therefore, perhaps of the more general characteristics of the kind covered by w-factor. They lend support to the theory of extraneous mediation of w-characteristics. But for scientific work on continuance effect it is desirable to use a device which obviates such changes in the quality of work done, or which would allow ready corrections to be applied to any quality changes that might appear. The X and Y scores must be in comparable units if the theory of continuance and hindrance effect is to be firmly founded. Otherwise, anomalies of the kind will appear in which a perseverator obtains low p-score due to the spuriously high Y-score he obtains, in its turn due to the poor quality with which he has written it.

We have adopted, therefore, the use of prepared blanks for p-tests. These require all individuals to write to a standard size and shape, which, of course, can be varied for different ages. Fig. 1 shows a prepared blank for the *writing* S2 test. Standard sample letters are printed at the left of the thirteen inch rows, and testees are required to write the letters as quickly as possible, but at the same time as nearly as possible like the samples. Emphasis is placed on the speed, but comparable size and quality are also expected. It is our experience that these blanks make marking easier, reliability higher, and correlations more stable.

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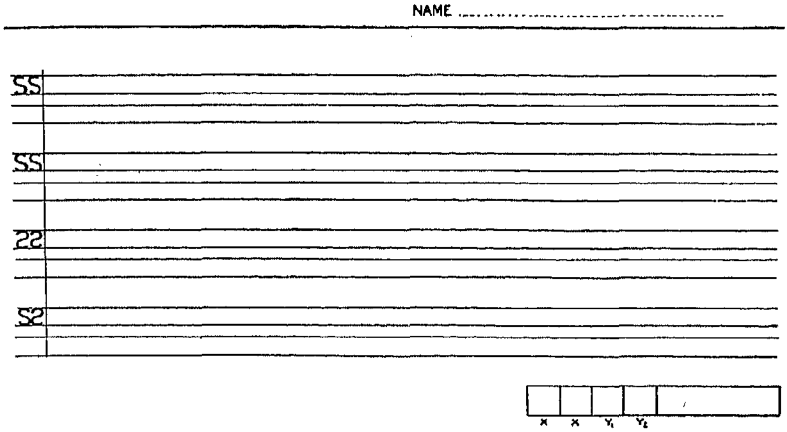
* LANKES, ibid.

FIG. 1.



IX.—TESTS FOR APPLICATION TO SCHOOL CHILDREN.

One other improvement readily effected in p-testing work is that of selecting the p-tests with due regard to past results and present theoretical possibilities. Hundreds of different tests can be suggested of one type or another, but a selection from these can be made on the basis of p-saturation, and tests of Type A are the most satisfactory in that respect as they are, also, on theoretical grounds. Only two such tests have been described previously, both by Dr. Wynn Jones (the *writing* S2, and *triangles*, used later by Bernstein), and these, we have already mentioned, are not altogether satisfactory. Others of this type, however, are listed. In a paper to follow this one we are to enter into details about these tests, their validation, correlations, exclusiveness, norms for school children, and methods of scoring and application. But it serves a useful purpose to give a list of some of them at this point.

To measure an individual's p it is often sufficient, if many different p-tests are used, to apply p-tests with the following shortened technique :

(a)	Writing S S S S	30 seconds.
(b)	,, S S S S	30 ,,
(c)	,, ƨ ƨ ƨ ƨ	30 ,,
(d)	,, S ƨ S ƨ S ƨ S	30 ,,

A rest of 10-20 seconds separates each of these test parts. P-score depends on the mean outputs in parts (c) and (d) compared with those in (a) and (b), but in most cases a p-score (X/Y) is used, where X is the mean number of letters written at (a) and (b), and Y is the mean for (c) and (d). The test only requires three minutes of testing time, compared with twelve to fifteen minutes for full application of the same test by the Bernstein technique. (Type A, page 187.)

For children below eight years of age there are as yet no well-tried tests. But they could, perhaps, best be of Type C, as in Test No. 7 below, for the eight to ten-year olds. Instead of handwriting, play activity and dancing to music, etc., might be fitted into the schema of Test No. 7.

Children from eight to ten years of age can be given the following tests: No. 1, *Writing Ticks* (*see* No. 1 of Fig. 2, which shows at (i) the normal or habituated activity, at (ii) the reversing, at (iii) the alternating activity)* ; No. 2, *Writing ww* ; No. 3, *Writing* Sƨ ; No. 4, *Writing* 6∂ ; No. 5, *Writing ee* ; No. 6, *Saying Colours* (a colour chart is required with 250 1 sq. cm. colours, red, blue, yellow, green, and black, in random order in rows, twice as many reds and yellows as other colours). The test proceeds as follows : (1) subject points to red colours one by one, naming each *red* ; (2) points to yellow colours, calling each *yellow* ; (3) points to both red and yellow colours, calling them *yellow* and *red* respectively (allow one minute for each part) ; No. 7, *Direct Test for Increase Induction* : (1) subject writes X's at a natural rate, a "slow natural rate ;" (2) writes X's as rapidly as possible ; (3) repeats (2) ; (4) writes X's at a natural rate again.

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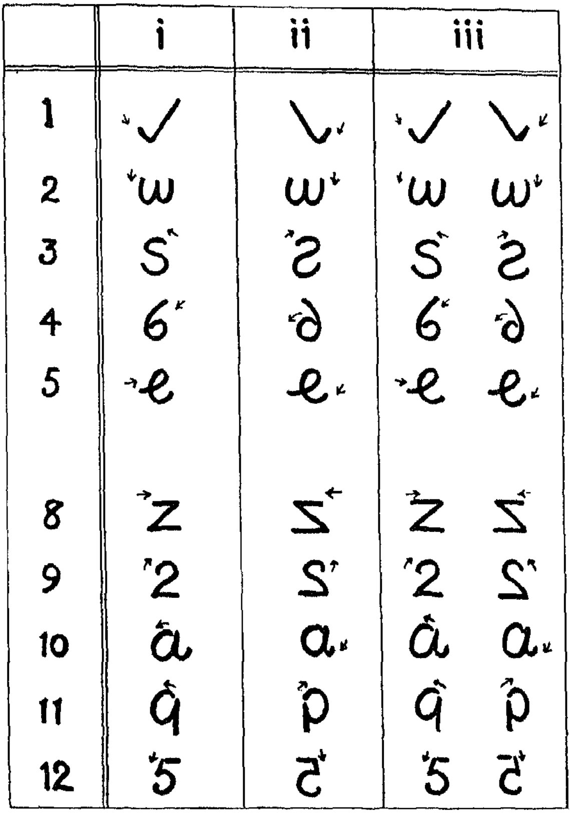
* The respective activities for the other tests are shown in Fig. 2 next to the numbers corresponding to the Test Numbers.

FIG. 2.

SHOWING THE MANNER OF WRITING CERTAIN P-TEST ACTIVITIES: (i) THE NORMAL, (ii) THE "REVERSE," (iii) THE ALTERNATING. EACH BEGINS AT AND TAKES THE DIRECTION SHOWN BY THE ARROW. THE STANDARD HEIGHT OF EACH, FOR TEN YEARS UPWARDS, IS 0·8 CM.



Older children, ten years and upwards, can be given the following tests, Nos. 2, 3, 4, and 5 (above), and No. 8, *Writing* ZƧ, No. 9, *Writing* 2Ƨ; No. 10, *Writing aa*; No. 11, *Writing* 9Ϙ; No. 12, *Writing* 5ƽ. The activities are shown, again, in Fig. 2. Each letter or number has to be written without lifting the pencil from the paper (except No. 12, where the tip of the "5" is written separately). Tests 2, 5, 10 involve reverse stroke activities; 1, 3, 8, 9, 11, 12 involve mirror-wise activities; and No. 6 is both reverse stroke and mirror-wise. They are applied in the order 1, 2, 3, 6, 7, 4, 5 for eight to ten-year olds, and 3, 8, 5, 12, 9, 10, 11 for older children. In group testing, Nos. 2, 5, 10 are open to cheating, but with careful application this can be reduced to a minimum, and it can always be seen whether an individual has not written the activities as required. In all cases two sample letters are allowed—i.e., in the *writing* SƧ test, two S's, two Ƨ's, and a pair SƧ are written by the testee on the prepared blank, prior to beginning the test parts. The tests have been used in mental hospitals, clinics, schools, and for testing adults. Intercorrelations vary from 0·65 ± 0·04 to 0·20 ± 0·04 under different conditions. The set of tests for children over ten years of age is a successful test of w-character, attention being paid, particularly, to the extremes of p-score.

X.—SUMMARY AND CONCLUSION.

Three types of ideo-motor perseveration tests have been described. One stands out above the others in point of neat theoretical interest no less than in point of observed facts, and this has been selected for standardization. The type involves alternating activity, typified by the *writing* SƧ test. The rapid alternations, and thereby the possible measurement of immediate after-effect, the newness of the reverse writing (Ƨ), and yet its similarity to the old activity (S), are features of no little interest. It is suggested that prepared blanks and standard-sized activities should be used. A list is given of some tests which are suitable for application to school children.

Four theories should be kept in mind when a search is made for an explanation of any p-factor measurement that might be made. The first is the theory of psycho-physiological perseveration, or continuance and hindrance effect. The second and third propose that p-tests measure character-like qualities in either an extraneous, or in an intrinsic, way. The fourth is that p-factor can be in part a measurement of individual differences in the ability to make and maintain a mental "set." All p-measurements, we believe, should be examined first, no matter what correlational or other controls may be used, from the point of view of the theory of extraneous mediation of w-characteristics. Then, with increasingly perfected testing technique, the other theories become more and more significant. The second theory, indeed, is rather a restatement of facts that require control before the other theories are seriously regarded.

For reasons to be given elsewhere, we have not referred in the present paper to the correlation of ideo-motor p-tests with sensory persistence tests, nor to the connection of this, as an experimental control, with the various theories we have put forward. That there are so many theories, and there might be more, especially from the non-perseveration aspects, is not a matter for perturbation. By their aid we can understand the connections made by p-tests with estimates of character qualities and with introversion-extroversion. In terms of the theory of " intrinsic will function " there is possibly a basis for considering that p-factor is a reflection of a fundamental, albeit elusive, property of the human mind.

RÉSUMÉ.

UNE INTRODUCTION AU TESTS DITS DE LA PERSÉVÉRANCE MOTRICE.

L'étude sert à introduire, avec un peu plus de détail qu'auparavant, certains tests de la persévérance idéo-motrice, et les théories qu'on peut suggérer pour en expliquer les résultats, un type de test, comprenant des activités alternantes, a été choisi pour l'étalonnage.

On avance quatre théories pour expliquer les mesures fournies par ces tests. La première est la théorie de l'effet de la continuation et de l'empêchement, la persévérance dite psychophysiologique. La seconde appelle l'attention sur l'intervention extérieure dans le test d'influences ayant rapport au caractère. La troisième est qu'il vaudrait mieux considérer les faits, connus jusqu' ici sous le nom de " persévérance," comme une fonction intrinsèque de la " volonté." La quatrième est qu'une tendance mentale bien marquée peut contribuer aux notes obtenues dans les tests.

Il faudrait examiner la plupart des recherches antérieures à la lumière de cette seconde théorie. La troisième, à notre avis, indique une base de la croyance fort répandue qu'une fonction générale peut se découvrir derrière tout comportement orectique. Les quatre théories ensemble nous aident à comprendre les rapports établis par les tests avec des appréciations de caractère, avec l'introversion-extraversion, etc.

On redige une liste de plusieurs tests, propres à être appliqués à des élèves, et l'on suggère qu'il faudrait préparer d'avance les feuilles, de façon à obliger les enfants à écrire dans une forme et une grandeur fixes.

ZUSAMMENFASSUNG.

EINFÜHRUNG IN DIE SOGENANNTEN MOTORISCHEN PERSEVERATIONSTESTS.

Die Abhandlung bezweckt eine mehr ins Einzelne gehende Einführung in gewisse ideomotorische Perseverationstests und die Theorieen, die man für die Tatsachen setzen kann, die sie angeben. Eine Art, die abwechselnde Tätigkeiten umfasst, ist zwecks Normierung ausgesucht worden.

Vier Theorieen werden vorgeschlagen, um die aus diesen Tests herrührenden Masstäbe zu erklären. Die erste ist die Theorie der Fortdauer-und Hemmungswirkung, die sogenannte psychologische Perseveration. Die zweite weist auf unwesentliche Dazwischenkunft charakterähnlicher Einflüsse in den Tests. Die dritte besagt, dass ein besserer Weg ist, die Tatsachen, die früher als "Perseveration" bekannt waren, zu betrachten. Die vierte besagt, dass eine bestimmte geistige Einstellung zu den in den Tests erzielten Zensuren beitragen kann. Die meisten vorhergehenden Untersuchungen müssen im Lichte der zweiten dieser Theorieen nachgeprüft werden. Nach unserer Meinung gibt die dritte eine Grundlage für den weitverbreiteten Glauben, dass eine allgemeine Funktion hinter allem orektischen Betragen liegt. Die vier Theorieen insgesamt helfen uns, die Zusammenhänge zu verstehen, durch die Tests mit Charakterschätzung und mit Introversion—Extraversion aufgedeckt wurden.

Es wird eine Liste einiger Tests gegeben, die zur Verwendung bei Schulkindern passen, und es wird vorgeschlagen, dass unbeschriebene Blätter benutzt werden sollten, damit die Kinder nach einer einheitlichen Art und Grösse schreiben müssen.

INFANT AND NURSERY SCHOOLS.

(Report of the Consultative Committee of the Board of Education.
H.M. Stationery Office, 1932. 2s. 6d. net, or by post 2s. 9d.)

THIS is the third volume issued by the Consultative Committee of the Board of Education under the chairmanship of Sir Henry Hadow. The earlier volumes dealt with the "Education of the Adolescent" (the so-called "Hadow Report") and the "Primary School." This final volume covers the education of children from the age of two to that of seven + so far as they are attending either nursery or infant schools. The importance attached to the early years of childhood by modern educational theory and the growing sensitiveness of the public conscience in regard to the effects upon children of bad housing conditions and parents' unemployment, make this section of the Committee's work of special interest at the present time. Apart from this, the Report well deserves study; the evidence collected has been set out in concise and interesting form, and the extracts from special memoranda submitted are of particular interest.

The introductory chapter gives an excellent summary of the development of the "Infant School" in England; explaining its unique position as an integral part of the State system of education. Important influences are described and their value assessed. The rise and development of the nursery school during the present century is then discussed. The whole account is carefully documented so that the reader can verify and amplify if he so desires. It is, however, evident that in admitting children from five, and in many cases from three years of age—whereas in most other countries the State education begins at six, seven, or even eight—the English schools from the outset have suffered from tendencies to "instruct" in formal subjects at far too early an age; a tradition from which they are only now beginning to free themselves. To this must be added the unsuitable buildings which many infant schools have "inherited" from their early beginnings and from which the later developed nursery schools are free. The chapter does full justice to the enlightened and "modern" ideas which inspired many of the earlier educationists, and it is only to be regretted that their views had such a limited effect on the schools themselves.

The physical development of children within the specified ages is discussed in a chapter and appendix based on a memorandum submitted by Professor H. A. Harris. This section is most valuable though the reader is irritated by a quite unnecessary repetition of the material in text and appendix. Professor Harris summarises the present position of medical knowledge in regard to growth and nutrition and the general health of the young child. Useful references are given for each point dealt with.

The chapter on the mental development of young children and the corresponding appendix are also based on a special memorandum, in this case submitted by Professor Cyril Burt and Mrs. Susan Isaacs. These give a very brief, but on the whole, clear summary of current educational theory especially as regards the important matter of the emotional life and training of children. Unfortunately, references for the statements made are few and this is a serious defect in an account which is necessarily so compressed. It seems inexplicable that such remarks as "experimental researches have recently thrown much light on . . . " or "recent studies . . . have revealed . . ," should have been left without reference to published material on the subjects in question.

The core of the Report is Chapter VI on the Training and Teaching of Young Children in Infant and Nursery Schools. It deals very briefly with the nursery school stage from 2—5, and more fully with the infant school from 5—7+, and seems to embody what the Committee regard as desirable for children of these ages in school. Much of it is excellent in spirit and suggestiveness. "It is on the open air activities and interests of the children that we would base the training and teaching of the infant school because it is here that the child's first interests emerge." "The unroofed country is the child's natural laboratory and workshop." "The young child loves to chatter, not necessarily to seek or communicate knowledge: at the outset it is mainly a form of self-expression." "There should be little or no formal instruction before the age of six at the earliest." Such statements are the commonplace of educational theory and are accepted by all who have had opportunities for sympathetic observation of children under such conditions as are here described, but it is well to have them set out in effective and authoritative terms. But since the Committee can describe so well what schools should be, it is disappointing to find them so half-hearted when it comes to actual recommendations. First, as regards nursery schools: these are to be encouraged where housing conditions make them desirable, but where homes are "good" the best place for the child is in the home up to the age of five. The acknowledged desirability of medical inspection and care to "bridge the gap" between the infant welfare centre and the primary school is to be met by extension of the work of the welfare centre. There is here a definite failure to recognize what stands out in the findings of the report: that on the one hand homes may be emotionally "bad" although housing conditions are good, and on the other hand children in most urban districts have no opportunities for the free open air life under safe conditions which the Committee rightly think desirable. In many cases the respectable little " villa " or flat is more restrictive and hampering to young children than the actual slum. Then the report seems to tolerate the break at five of children who do go to a nursery school. This defect is indeed pointed out by Miss Freda Hawtrey in a special note. Apart from " poor " districts the Report recommends " model " nursery schools as experimental schools which are to be accessible to teachers from the ordinary infant schools. These schools will, however, lose much of their value if the children leave at five, and Miss Hawtrey's recommendation that they should be able to keep children till 7+ seems preferable. The Committee seem to accept without question the age of two as that of admission to nursery schools, but the evidence given with regard to the child's emotional development at this age, his tendency to cling to his mother, and to the teacher, and the violence of his emotional reactions, seem to suggest, what many who have observed children on entrance to nursery schools feel strongly, that at two the children are too old or too young for the sudden shock of separation from his mother. At an earlier age he would feel it less, at a later age he would be better fitted to meet and partly understand it.

The recommendations with regard to infant schools are perhaps particularly disappointing. The Committee seem, it may be suggested, unfamiliar with schools as they are ; they are inclined to believe the best, and fail to realize what drastic changes would be needed to transform schools as they are to anything approaching the suggestions of Chapter VI. We may agree that the infants' teachers are receptive of new ideas and that they are often liberal in spirit, but their surroundings and opportunities are woefully illiberal. Over-large classes, lack of playground accommodation, unsuitable buildings, and an over-formal tradition make a heavy burden for the enlightened teacher, and it is regrettable that the Committee has not set itself to fight against these and other disabilities with something of that Crusading spirit which made the original " Hadow Report " such an inspiring document.

It is more hopeful to read the account of the Bradford reorganization of some of its infant schools on open air lines and in the " spirit " of the best nursery schools. These schools may admit children at two and they keep them up to the junior school stage at six or seven. The report dismisses this reorganization with the somewhat curt remark that it is still in the " experimental stage," but many readers will feel that the " experiment " is on the right lines and well deserves encouragement.

C. M. MEREDITH.

BOOK REVIEWS.

The Growth and Variability of Intelligence: British Journ. of Psychol. Monog. Supplements No. XVIII. Part I by C. A. RICHARDSON, M.A.; Part II by C. A. RICHARDSON and C. W. STOKES, M.A. (Cambridge University Press, 1933. Pp. 83. 8s. 6d.)

The first part of this extremely important monograph describes the testing of all the children in Blackburn over six and under fourteen years of age by a group test, and the use of the data thus obtained to check Thurstone's method of making an *absolute* scale of intelligence. The second part of the monograph applies to the same data methods suggested by the work of Courtis (who applied the Gompertz equation to growth curves), methods considerably extended and refined by the present authors.

Quite apart from the theoretical interest of the monograph, the experimental data given are of the highest value. The sample of children, some 12,000 in all, from the town of Blackburn was practically *complete*. How very important this is for the purpose of standardizing tests and basing any conclusions on their results is only perhaps fully realized by those fellow-workers who have experience of the distortions which sampling can produce. Probably no other data are as faultless in this respect as are Mr. Richardson's. One consequence of this is that the group test used (since published as the *Junior Simplex* Intelligence Test) which the author modestly describes as a "by-product," is extremely thoroughly standardized; and since its reliability on ten-year-olds was 0·95, and its validity against a criterion composed of careful teacher-estimates, 0·927, it would seem that we have here one of the best of group intelligence tests, suitable moreover for a fairly wide age-range.

It is not possible in a short notice to do justice to the theoretical side of the monograph. The problem is the old one of finding real units of mental measurement, and an absolute zero. Part I is a workmanlike trial of Thurstone's procedure on the Blackburn data and Mr. Richardson's evidence is found not only to support Thurstone's conclusion that the spread of intelligence is proportional to its mean level at that age, but also to give the probable constant value of this ratio σ/M as 0·18. Part II, where Mr. Stokes joins authorship with Mr. Richardson, is still less easy reading, for its mathematics is subtle and original. Here Thurstone's assumption that the ability tested by each separate test item is the same is examined, and while not found to be entirely justified, is admitted to "provide a picture of all-round mental ability . . . probably not far from the truth." "The growth curves of the abilities tested by different test items are distinct from one another" yet "cluster fairly closely about a mean growth curve." The value of 0·18 for the ratio σ/M is further confirmed, and is found to be "not only nearly constant from age to age, but also . . . from item to item." The mean growth curve obtained was an almost perfect G-curve, that is a curve of the general form such that x is proportional to log log y. Development reaches (on the average) 96 per cent by eighteen years, of age and 99 per cent at twenty-four, if somewhat speculative extrapolation can be trusted. Finally the authors have some interesting comments on the fact that "the differences of intelligence which we . . . measure with our tests, between one year and another, and one individual and another, though important from a practical point of view, will often be quite small when viewed against the background of the absolute scale," a conclusion which has considerable theoretical importance.

G.H.T.

Sexual Regulations and Human Behaviour: By J. D. UNWIN, M.C., Ph.D. (Williams and Norgate, Ltd. 1933. 7s. 6d.)

By conducting an enquiry into facts presented by cultural data of eighty uncivilized societies and seven civilized societies, the author has tested the validity of the suggestions of psychologists that when the social regulations forbid direct satisfaction of sexual impulses the emotional conflict is expressed in another way, and that what we call "civilization" has been built up by compulsory sacrifices in the gratification of organic desires. As a result of his researches he endorses the suggestions of the psychologists and adds important conclusions of his own.

In an arresting manner society after society: Maori, Tahitian, Babylonian, Sumarian, and dozens of others, are considered, and the evidence put forward with great clarity though of necessity in condensed form. Definitions of terms are given where required. Such criticism as occurs regarding some unreliable accounts of uncivilized peoples gains considerable weight from the fact that the author has lived and travelled among such different races as the Ethiopians, Somalis, and non-Amharic-speaking people of modern Abyssinia.

On the face of the earth are some societies restless and energetic, others slothful. Some remain the same, others change again and again. In one area after another human societies awake out of their lethargy, manifest their potential powers, and display great activity. One after another they relax. The products of their former energy crumble to dust. What conditions govern this monotonous routine? The answer from this investigation is that the conditions are those of compulsory continence. In a society sexual opportunity is reduced to a minimum and a display of energy results. Sexual opportunity becomes extended and when the less rigorous tradition has been inherited by a complete new generation the energy decreases and disappears. Along with the reduction of sexual opportunity has always gone the deprivation of women and children of legal status. In the eyes of the law man alone was an entity: women and children were legal nonentities. Social energy was purchased at the price of individual freedom. The evidence is that the subjection of women and children becomes intolerable to the women, reforms apparently designed to correct this state of affairs are introduced, these reforms have always been accompanied by an extension of sexual opportunity.

The author is careful to point out that the alliance between sexual opportunity and female subjection seems to have been by chance and that it would be rash to conclude that the alliance is indissoluble. His considered opinion founded on historical evidence is that if ever a society is to keep its sexual opportunity at a minimum for an extended period it must first place the sexes on a footing of complete legal equality. It must alter its economic and social organization in such a way as to render it both possible and tolerable for sexual opportunity to remain at a minimum for an extended period; so, he contends, would it achieve a higher culture than has yet been attained. **F.M.A.**

One Hundred Years of Psychology: By J. C. FLUGEL. (Duckworth. Pp. 384. 15s.)

This is the first of a series of books called "The Hundred Year Series," and if it is a fair sample of what the series is to be it will indeed be a useful one. Professor Flugel recognizes and indeed stresses in his preface, the difficulty of writing within a short compass a history of modern psychology; but he is far too modest about the result of his own effort. For this book reveals not only an extraordinarily wide range of reading, but such clarity and interest in exposition as should make the book welcome to the general reader as well as to the student of psychology. It is not too much to say, indeed, that Professor Flugel's style rises at times to a very high level of rhythmic prose.

Another aspect of the book which deserves mention is the way in which the writer frequently links up an earlier author with some quite recent development; for example, Herbart's views as to ideas are linked with some aspects of the work of Freud; James Mill's extreme associationism with some recent expositions of conditioned reflexes, and so forth.

It is most useful for the young student of psychology to be taught thus that schools of thought which seem to be entirely novel often have their roots in the past; and the historical approach not only checks exaggerated ideas as to the entire novelty of new developments but enables the student to see possible lines of criticism and also to appreciate ways in which the older doctrines have been improved upon.

Another good result of the reading of such a book as this should be that the more advanced student at least should be led to go back to some of the earlier writers who are still worthy of study. The reviewer, for one, welcomes Professor Flugel's appreciation of some aspects of the work of Herbert Spencer.

Students of education may think that the chapter labelled " Psychology and Education " provides but a brief exposition of the very important developments of educational psychology within the period dealt with. There are, however, many points of contact with education in other parts of the book where Professor Flugel shows himself alive to educational applications, and of course there is scarcely any section, particularly of Part IV (dealing with 1900-1933) which has not great importance for educational psychology, for example, the chapters on Behaviourism, Hormic Psychology, Mental Tests, and Spearman's work.

Altogether the book should prove a most welcome addition to both private and college libraries. C.W.V.

How the Mind Works: By CYRIL BURT, M.A., D.Sc., ERNEST JONES, M.D., EMANUEL MILLER, M.D., and WILLIAM MOODIE, M.D. (George Allen and Unwin, Ltd. Pp. 336. 7s. 6d.)

This book gives three series of talks broadcast by the authors which have been revised and enlarged for publication by the General Editor, Professor Burt. The editor himself contributes the greater portion of the book, including the two chapters on " The Conscious Mind in the Adult " and the large and very interesting Section III on " How the Mind Works in Society." These chapters in themselves form a most useful popular introduction to the study of psychology. The last section perhaps is particularly valuable in which Professor Burt links up psychology with problems of international feeling, of politics, leisure, art, and religion in a most lucid and fascinating way. In a broadcast talk the speaker is usually apt to appear dogmatic, but Professor Burt is restrained and cautious.

The rest of the book is contributed by three medical men, and parts of their treatment are necessarily primarily concerned with, or based upon, a study of somewhat abnormal, exceptional cases. Dr. Ernest Jones is, as usual, lively, interesting, and clear but by no means restrained in dealing with the unconscious mind. For example, he makes the extraordinary statement that it is Freud's discovery, and, indeed, " the essence of his discovery," that " when one idea follows another there is bound to be some connection between them, whether the connection is apparent or not"; whereas the student of the history of psychology is aware that the germ of the idea appears in Hobbes, perhaps more clearly with Hume, and is explicitly stated by M. Ribot in *La Psychologie Anglaise*, where he makes the comprehensive assertion that " this law of association is the truly fundamental, irreducible phenomenon of our mental life; that it is at the bottom of all our acts; that it permits of no exception; that neither dream, reverie, mystic ecstasy, nor the most abstract reasoning can exist without it."

Dr. Emanuel Miller and Dr. Moodie deal with " How the Mind Works in the Child," and here it is rather with the type of child which comes under the observation of the Guidance Clinic that is dealt with, but with many useful suggestions for parents and teachers.

The exceptionally clear printing and convenient size and shape of the book deserve mention. C.W.V.

Have you Good Taste?: By MARGARET H. BULLEY. (Methuen and Co., Ltd. Pp. 54. 3s. 6d.)

This is a very attractive book. The writer states her object in the first sentence as follows: " This book seeks to make a contribution towards the training of taste in regard to the lesser arts."

There is little doubt that a careful reading of the book, accompanied by a study of the illustrations and the judgments upon them, should have the effect that the author desires upon many readers. The first part of the book is a popular but acute discussion of some æsthetic principles as applied chiefly to some of the objects of everyday life, such as furniture, utensils, and so forth. Miss Bulley makes no pretence to enter into fundamental psychological analysis of æsthetic appreciation, and some of the principles enunciated are, as indicated, popular, and in a sense superficial from the point of view of psychology. On the other hand, as far as she goes, she seems generally sound.

To most readers the second part of the book will probably be even more interesting. Here are given excellent illustrations of two chests of drawers, two bookcases, two old chairs, two coffee pots, and pairs of jewels, wineglasses, pieces of embroidery, mats, and so forth. Miss Bulley had each of these pairs judged by half a dozen experts in various branches of art, who were practically unanimous in their choice of the better member of each pair. It is an entertaining thing for the reader to test himself and then to look up the judgment of the expert and read the author's discussion of the pros and cons.

A brief appendix makes practical suggestions in the training of taste. A second appendix is provided by Professor Cyril Burt on a test of æsthetic judgment by means of nine of the pairs of illustrations carried out in co-operation with *The Listener* and the B.B.C. Some 6,000 replies were received and Professor Burt in this most interesting account gives the various scores of different classes of individuals—e.g., university men and women, teachers, clerks, artists, labourers, and so forth. The reviewer is interested to see that divergence of opinion from the critics is greatest in the pieces of embroidery, the one in which he himself diverged from the critics' judgment, and it seems to him that the actual purpose for which some of the designs are intended or used is an important factor, as, indeed, one or two of the artists themselves suggested. Thus I preferred design 34 to 33 until I read that they were both rugs, for which 34 certainly appears unsuitable. It is also worth noting that the score of the men artists was not as high as that of authors or of teachers of arts subjects. Among the women artists scored less than did musicians and teachers of art. A word of commendation is due to the publishers for the excellent printing and reproduction of the illustrations.

A Study in Æsthetics: By MILTON H. BIRD. (Harvard Monographs in Education. Harvard University Press, and Humphrey Milford. Pp. 117. 5s. 6d.)

This monograph first gives a brief outline of some of the main æsthetic theories of the past and of the present time. There follows a chapter discussing the results of experimental æsthetics and their bearing on these theories, the main conclusion being " that there is no one thing which is considered to be beautiful by all people and that opinions concerning what is beautiful approximate the normal distribution curve."

Then follows a description of various types of tests of drawing given by the author to children. The results of these were treated by the method of correlation, one of the main conclusions being " that all types of drawing, whether supposedly based on 'general memory,' on 'direct observation,' or on 'immediate memory' of a model involve some common mode or modes of behaviour."

This useful study is completed by a brief discussion of some practical applications for the teaching of art.

The Dark Places of Education: By DR. WILLI SCHOHAUS. (George Allen and Unwin, Ltd. Pp. 351. 12s. 6d.)

This book, to which Dr. P. B. Ballard contributes a short foreword, arose out of a questionnaire printed in an educational paper in Switzerland inviting readers to answer the simple question " From what did you suffer most at school ? "

Dr. Schohaus here gives a selection from seventy-eight of the most typical reports set out under various headings, and these make most interesting reading. The first half of the book consists of chapters on similar topics to those under which the various reports are arranged, e.g., discipline, intellectualism, " mis-education," rise of personality, comradeship and so forth, in which the author has expounded his own positive views on education. There is little reference in these chapters to the later reports of the questionnaire, but the answers in the second part do illustrate many of the evils against which Dr. Schohaus is contending. The style of the book is stimulating and clear, the argument essentially reasonable though sometimes the author is content to infer rather than to prove. We should like also to know how far the reports quoted are representative of the whole.

It seems clear, however, that there is a more intense antagonism towards school life in Northern Switzerland where this study was made than there is in this country, that is if these reports can in any way be taken as fairly representative; but, naturally, those who had a good deal to complain of would be most likely to reply to the questionnaire.

Psychology: By SHEPHERD IVORY FRANZ AND KATE GORDON. (McGraw-Hill Book Co., Inc. Pp. 494. 15s. net.)

This book was written by nine students of psychology representing different specialized training.

The book is in five parts: I, Orientation; II, General Aspects of Mind (Will, Personality, Intelligence, Feeling, and Emotion); III, Psychological Foundations (Learning, Basic Activities, Nervous Structures and Functions, Sensation); IV, Mental Activities (Association, Perception, Attention, Imagination, Memory, and Forgetting); V, Schools of Psychology.

The authors have succeeded in presenting a survey of modern psychology which attempts to select from each school those views and theories which are of most value in contributing to general progress in the study and explanation of mental occurrences.

The book is worth reading, but its length is against its being widely read by the general reader to whom it should make its greatest appeal. A.E.C.

Character in Human Relations: By HUGH HARTSHORNE. (Charles Scribner's Sons. Pp. 367. 10s. 6d. net.)

The author presents in this book an empirical approach to a theory of character scientifically objective in nature. He maintains that there is a movement away from traditional practices and theories towards a critical impartial treatment of moral problems.

After surveying existing methods of character training and theories of character, he summarizes some developments in psychological knowledge which emphasize the importance of the autonomic system, the conditioning of reflexes, and of social behaviour, for the development of character which is for him a way of living, not a set of thoughts or practices added on to life. Then he considers how society can provide in its institutions and daily life " those experiences of fellowship, social participation, thoughtful consideration of values, and responsibility for results by which alone true character can be achieved."

The book is written with commendable restraint and a consciousness of the value of the experience of the past as a basis for further advance. A.E.C.

The Principles of Logic: By C. A. MACE, M.A. (Longmans, Green and Co., Ltd. Pp. 388. 12s. 6d.)

The author has attempted to provide a rapid survey of the subject suitable both for those who propose to study it but for a single year and for those who intend to prolong their studies.

The book contains an outline of the logic of tradition (Chapters V—VIII), an introduction to the modern generalized theory of deduction (Chapters IX and X), and a review of the principal lines of thought since Mill concerning the foundations of induction and scientific method (Chapters XI—XVIII).

The author has endeavoured to induce students to think about genuine logical problems, and has refrained from introducing any " exercises." For many students, especially for those studying under a teacher, this is probably advantageous, but for those studying without a teacher the absence of testing and stimulating questions is likely to prove a serious handicap especially if this volume is the only text-book available.

The book is clearly written, the examples are well chosen, and the introduction to modern lines of logical thought meets a real need.

A welcome addition to logical literature. A.E.C.

Essay on National Education: By L. R. DE LA CHALOTAIS. Translated by H. R. CLARK. (Edward Arnold. Pp. 176. 6s.)

Mr. Clark's translation of *l'Essai d'Education nationale* is yet another useful contribution to the source documents of the history of educational thought and theory. Mr. Clark and his publishers have done service by making this work available. The fact that so good a translation is before us is of less importance, perhaps, than that people who have hitherto known of Louis Réné de la Chalotais by little more than name can now understand him as the producer of a balanced educational opinion which in its *practical* bearing is more worthy of attention than the contemporary " Emile." Mr. Clark does not claim to have discovered a neglected educationist, but he introduces us to his original arguments woven, as they are, into a definite psychological texture. The introductory section giving the historical setting of the essay is adequate for its purpose, and the translation of the document itself affords pleasure to the English reader. A.P.B.

Psycho-analysis and its Derivatives: By DR. H. CRICHTON-MILLER. (Thornton Butterworth Ltd. 1933. Pp. 256. 2s. 6d.)

This useful little book in the Home University Library of Modern Knowledge Series gives a summary of psycho-analysis and its derivatives. The author aims at studying his subject from an external and impartial point of view. He is exceptionally successful in this very difficult task. Throughout he maintains an appreciative though critical attitude and evaluates reasonably the work of Freud, Jung, Adler, and Prinzhorn.

In the concluding chapter comparisons are made and the volume ends with a quotation emphasizing the many-sidedness of truth.

A Study of Growth and Development: By R. M. FLEMING. With a Statistical Analysis by W. J. MARTIN. Issued by the Medical Research Council. (H.M. Stationery Office, 1934, p. 85. 1s. 6d.)

This report relates to work which has been carried on during the past fourteen years, and describes the results of investigations which have been made into certain characteristics of some 4,300 boys and girls between the ages of 3 and 18. The observations taken include stature, eye colour, hair colour, forehead shape, head length, and head breadth. Children in secondary schools were asked to say what occupation : (*a*) In school, and (*b*) in their leisure time, seemed most enjoyable to them. In a few schools it was possible to get facial measurements and fuller cranial observations, while in a few cases full anthropological measurements of a whole family have been obtained. Certain racial and sex differences have been noted. In a general survey of psychological features there are some interesting criticisms of school reports on children's work—e.g., " The report ' good all-round ability ' never proved on inquiry to have any reference to skill in craftsmanship for boys or housecraft for girls, and musical ability did not remotely enter into such a report." The findings are illustrated by numerous graphs.

It is necessary to add that the conclusions reached as a result of the investigation are difficult to ascertain. To quote from the summary: " The reader of this report in order to be in a position to assess the value of my findings would need to work over the whole of the material, and even the mere reproduction of the written data would cause an impossible outlay. It is not even practicable to publish an adequate sample." Certain results of the statistical analysis which are mentioned do not appear to be of great practical importance, but as the author emphasizes, this study is intended as a prelude to further work. As Miss Fleming explains: " I make no more claim for this report than that it gives, as I believe, sufficient indications of the method followed, and the conclusions tentatively drawn, to encourage others to study what, in my opinion, are anthropological problems of first-rate importance."

Although investigations of this kind have not perhaps any direct bearing upon educational problems, yet they are of very considerable interest from an anthropological point of view, and as such should be of interest to teachers.

The Year Book of Education for 1934: Edited by LORD EUSTACE PERCY, M.P. (Evans Bros., Ltd. Pp. 960. 35s.)

This year book would seem to be of increasing value as each volume appears, for it makes the series more and more a complete work of reference; and that is primarily its function and chief value in spite of the fact that the year books contain also a number of stimulating articles dealing with possibilities of the future. In this volume, for example, there is a notable article by the editor in chief on the replanning of the schools, where some profoundly interesting and important suggestions are made as to reorganization of the education of children of 11—16. On the whole, however, it is for the articles stating matters of fact which the book is specially of value, and in this volume we have a large section dealing with the educational system of the English-speaking nations, in which England and Wales are dealt with by Lord Eustace Percy and Harley V. Usill. The Colonies and other countries are dealt with briefly, and there are some interesting comparative diagrams. Part II deals first with events in education of the English-speaking nations, and then, later, with a general survey of secondary education, chiefly in England, Wales, and Scotland. The whole forms a further valuable book of reference. We have one suggestion to make, namely, that full as the index is a book of this size and importance is worth a more detailed index. Possibly the editor might consider the publication eventually of a detailed index covering, say, the first five volumes.

The Poor Student and the University: By L. DOREEN WHITELEY, with an introduction by Percy Alden. (George Allen and Unwin, Ltd. Pp. 159. 6s.)

This useful handbook gathers together a great deal of information in reference to the financial help towards university education, the scholarship grants, and loans from education authorities and several other sources. A definite feature of the book is the figures showing the varied rewards given in different localities for similar purposes. The book is thus of service to those who have to guide school pupils in the direction of the choice of university or to help them to make the best use of the opportunities that exist. To the student of education it is also useful for the particulars given in such subjects as the analysis of the student population of the British universities during recent years. In the handling of some of these figures, however, the author is sometimes rather difficult to follow. For example, it looks as though there must be something wrong in one or other of the two methods of calculating the proportion of university students coming from elementary schools about the years 1929 or so ; for of those who entered it is found that 64 per cent of the university students in England and Wales came from elementary schools, but by another method of calculating Miss Whiteley reaches the conclusion that only 21 per cent of the total university population were ex-elementary school pupils. Even allowing for the difference of the basis of calculation described here (pp. 37 and 38) it seems difficult to believe that so great a difference should appear. At times there seems to be an assumption that what is needed is still more provision for the poor student. Miss Whiteley was not apparently familiar when she wrote with recent figures showing the very large proportion of scholarship holders at the provincial universities who do very unsatisfactory in their degree courses.

Principles and Practice of Geography Teaching: By H. C. BARNARD. (University Tutorial Press. Pp. 233. 4s. 6d.)

When the reader has overcome an initial feeling of irritation at the patchiness of the arrangement of some of the material, he will find this book a comprehensive and valuable contribution to modern ideas on the teaching of geography. The author deals with the history of the teaching of the subject, and with the conception of modern geography as a school subject where, as he states, "the classification of regions on a climatic basis is fundamental." The value of co-ordinated work in geography and other subjects of the curriculum and the need for co-operation between the geography teacher and specialist teachers in other subjects, are emphasized. The content of school geography is examined and suitable syllabuses outlined.

An interesting feature of the book is the treatment of the possibilities of local regional survey in school, in conjunction with, but not confined to, the geography teaching, the value of such work being considered, if not "as an integral part of school geography, yet as an admirable commentary upon it." Details of a local survey of a region in Kent where the geographical inter-relationships are relatively simple, yet interesting, are given. The author realizes the necessity of varying the approach and treatment according to the personality of the region, and his account should inspire others in their approach to local surveys.

A useful bibliography is included. E.D.

The Cortical Localisation of Cerebral Function: BY PROFESSOR J. SHAW BOLTON, M.D., D.Sc., F.R.C.P. (Oliver and Boyd. Pp. 23. 6d.)

In this, No. 12 of the Series of Henderson Trust Lectures delivered in Edinburgh, the subject is treated in quite general terms, no attempt being made to localise particular functions to small areas of the cortex.

The evolution of the mammalian neopallium is briefly indicated, and comparisons of several large areas of cortex are then made with one another. Stress is laid on the histological differences of these areas, and evidence drawn from the study of carnivore, anthropoid, fœtal, and defective human brains is also given.

The work of Fulton, Jacobsen, and Kennard on the effects of experimental destruction of cortical areas in monkeys is extensively quoted, but no reference is made to the results of trauma to the human cortex.

A series of excellent diagrams and plates is given, and histological and clinical evidence of the localisation of cerebral function is lucidly reviewed. The importance of the prefrontal region of the human cortex is particularly emphasized.

The book will not be of great value to anyone who has not considerable knowledge of anatomy.

The Logic of Industrial Organization: by P. SARGANT FLORENCE. (Kegan Paul, 1933.)

We need not leave economics all to the economists. The final chapters of this book concern schoolmasters and psychologists as well, and especially Chapter VII on "The Stimulus to Enterprise," dealing with types of business administrators, and Chapter VIII on "Education for Business Administration." The requirements for administration are discussed under inborn qualifications and inbred disqualifications. The soi-disant "public schools" come in for some severity of criticism as, indeed, training character, but of the wrong sort. The universities seem more hopeful as agents for rescuing the essential 1 per cent who might be trained for higher business administration. On page 207 is a primitive attempt to assign marks to different types of managing director. The self-made man, the technician, and the family head each get four marks out of ten, the financier scores about seven, and the trained administrator eight. A diagram on page 135 helps to explain "line and staff" organization and may prompt educationists to consider where psychological laboratory and educational research department should be placed in the organization of a school. H.R.

FOREIGN JOURNALS.

Zeitschrift für Pädagogische Psychologie. February, 1934.

A paper on "Deutschdruck, nicht Lateindruck" and the relative legibility of Fraktur (=German Gothic) type as against Antiqua (=Roman or Romana type) appears to show that German type is the more legible when tested experimentally.

VOLUME IV. NOVEMBER, 1934. PART 3

DISCREPANCIES BETWEEN THE RESULTS OF INTELLIGENCE TESTS AND ENTRANCE EXAMINATIONS TO SECONDARY SCHOOLS.*

BY A. G. HUGHES.

I.—*Introduction.*
II.—*Comparison of the results of the scholarship examination and the intelligence test.*
III.—*Inquiry into individual cases of discrepancy between the results of the scholarship examination and the intelligence test.*
IV.—*Results of the inquiry into discrepant cases*
  (*a*) *Teachers' estimates.*
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V.—*Individual case studies.*
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I.—INTRODUCTION.

IN London, junior county scholarships are awarded on the basis of an examination held twice a year. The candidates who take this examination must be between the ages of ten years six months and eleven years, and except in special circumstances they must have passed a qualifying examination which is conducted in the elementary schools about three months previously. The subjects of the examination both at the preliminary and at the final stage are English and Arithmetic ; there is no detailed syllabus for either subject, but for the final examination the regulations state that " an exercise involving English Composition " will be set " so framed as best to ascertain the abilities of the candidates." In actual practice, four papers are set at each examination, thus :

English A : An essay (forty-five minutes Preliminary ; forty minutes Final).

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* The investigation was carried out at the request of the Education Committee of the London County Council by a committee of officers. I wish to express my indebtedness to my colleagues on this committee. Much of the work of the investigation has been done by them, and I have also had the invaluable help of their suggestions and criticism in connection with my investigation of individual cases, which forms the subject of the major part of the present report.

I wish further to express my indebtedness to the Education Committee for their kind permission to publish this report. It is necessary also to state that the opinions it contains are my own and that neither the Education Committee nor the investigating committee are in any way responsible for them.

English B : A paper designed chiefly to test comprehension of a short passage, meanings of words, etc. (thirty minutes Preliminary ; thirty-five minutes Final).

Arithmetic A : A paper containing straightforward sums of the type usually called " mechanical " (thirty minutes Preliminary ; thirty-five minutes Final).

Arithmetic B : A problem paper (thirty minutes Preliminary ; forty minutes Final).

In 1927 the Education Committee agreed that it was desirable to investigate the value of an intelligence test as a possible means of or aid to awarding junior county scholarships, and authorised the carrying out of an experiment as a piece of research work. Accordingly, over 800 children (430 boys and 394 girls) in the Chelsea division who sat for the final examination in English and Arithmetic in October, were given a group intelligence test in November. The results were sufficiently interesting to warrant a repetition of the experiment on a larger scale, and in 1929 the children in Chelsea, Islington, and Southwark Divisions who had taken the final examination on 19th October were asked to submit themselves to an intelligence test on 2nd November at the same centres which they had attended for the examination. This test was taken by over 2,000 children (1,107 boys and 1,083 girls).

The intelligence test used was specially prepared by a sub-committee of the investigating committee. It consisted of eight sections containing questions of the following well-recognised types : (*a*) Understanding instructions, (*b*) Opposites, (*c*) Mixed sentences, (*d*) Analogies, (*e*) Similar words, (*f*) Completing sentences, (*g*) Arranging in order, (*h*) Reasoning. The whole test occupied forty minutes, a time limit being fixed for each section.

The scholarships, both in 1927 and 1929, were awarded as usual on the basis of the results of the examination in English and Arithmetic ; the results of the intelligence test were merely used for purposes of comparison.

II.—COMPARISON OF THE RESULTS OF THE SCHOLARSHIP EXAMINATION AND THE INTELLIGENCE TEST.

Generally speaking, children who did well at the scholarship examination also did well in the intelligence test and vice versa. The correlation co-efficients between the results of the two types of examination were as follows :

1927..............	Boys, ·64 ; Girls, ·59
1929..............	Boys, ·66 ; Girls, ·62

Some measure of the agreement between the two tests is also indicated by the following figures, which show the numbers and the percentages of actual scholarship winners who would have obtained scholarships if the intelligence test had been the sole means of assessing the candidates :

> 1927—Scholarship winners : 43 boys and 39 girls ; of these 21 boys (or 49 per cent) and 23 girls (or 59 per cent) would have won scholarships on results of intelligence tests alone.
>
> 1929—Scholarship winners : 106 boys and 95 girls ; of these 55 boys (or 52 per cent) and 51 girls (or 53 per cent) would have won scholarships on results of intelligence tests alone.

It will be seen that about 55 per cent of the scholarship winners both in 1927 and 1929, would have won scholarships if the examination had consisted solely of an intelligence test. The remaining scholarship winners were also, generally speaking, very high in the order established by the intelligence test.

But although there was this general measure of agreement between the two types of examination, there were in both experiments a number of instances where the assessment of a candidate given by the intelligence test was markedly different from that given by the scholarship examination. It was thought desirable to investigate these discrepant cases in some detail.

III.—INQUIRY INTO INDIVIDUAL CASES OF DISCREPANCY BETWEEN THE RESULTS OF THE SCHOLARSHIP EXAMINATION AND THE INTELLIGENCE TESTS

Dr. Ballard investigated a small number of discrepant cases in the 1927 experiment and found that "in some instances the scholarship examination fails to capture quite brilliant children."—(*Unpublished report.*)

With the larger number of children involved in the 1929 experiment it was possible to find 120 striking cases of discrepancy and the investigation of these cases was undertaken by the present writer. The children were divided into two groups.

The first group contained children who did not win scholarships, but who would have done so if the scholarships had been awarded on the results of the intelligence tests. We will refer to this group as I winners. It consisted of 30 boys and 30 girls whose position was very high in the intelligence test list, but comparatively low in the examination list ; it contained, for example, a girl who was 30th in the intelligence list but 895th on the examination list ; a boy who was 16th by intelligence test but 357th by examination.

The second group contained children who won scholarships, but who would not have done so if the scholarships had been awarded on the results of the intelligence tests. We will refer to this group as E winners. It consisted of 30 boys and 30 girls whose position was very high in the examination list, but comparatively low in the intelligence test list; it contained, for example, a girl who was 4th on the examination list but 327th on the intelligence test list; a boy who was 28th by examination but 423rd by intelligence tests.

The boys and girls were ranked separately, and the following numbers are involved:

Boys	103 scholarships awarded out of 1,107 candidates.
Girls	95 scholarships awarded out of 1,083 candidates.

In forty of the cases, the investigator visited the elementary schools and discussed the pupils in question with the head teachers and with the class teachers who knew them best. It was not possible to continue the method of personal interview for each of the 120 cases, so the remaining eighty were investigated by correspondence. On the basis of the information which had been obtained in the forty cases investigated by interview, the following questionnaire was drawn up and sent to head teachers:

Name of Pupil...................... .... *School*..

Address of School pupil is now attending..

Did you think the pupil would win a scholarship? (yes, certainly; yes, probably; yes, possibly; doubtful; no.)

Is the pupil, in your opinion, a child who would profit by a secondary school education sufficiently to warrant the award of a scholarship?

Home Conditions (e.g., favourable, tolerable, bad; add, if possible, information on the following points: father's occupation, number in family, parents' keenness on child's educational progress.)

Health (e.g., was pupil considered delicate, robust, etc.? has pupil suffered from bad eyesight, deafness, or serious illness(es)?)

Attendance at School (e.g., regular, irregular. If pupil has changed schools frequently, please give what details you can of such changes.)

Intelligence (e.g., was pupil average, good, very good, or exceptional? Please quote any evidence you may have in support of your opinion, e.g., position in class, quickness in grasping explanations, etc.)

School Work (e.g., subjects in which pupil was especially good or weak.)

Character (e.g., was pupil neat, lazy, careless, hardworking, variable, nervy, placid, imaginative, matter-of-fact, talkative, etc.?)

Additional Information. (Please add, either on this form or in a covering letter, any further information you think might be helpful.)

Signature..

Head Teacher.

A covering letter explained that the pupil was one of the interesting cases which were being followed up in connection with the intelligence test investigation, that the information would be treated as confidential and would in no way affect the pupil, and that the more free and frank the answers were, the more valuable they would be.

Of the 120 cases, it was possible to trace eighty-seven pupils who had gone on to secondary or central schools. The details are given in Table I.

TABLE I.

CASES FOLLOWED UP IN SECONDARY AND CENTRAL SCHOOLS.

	I Winners.			*E Winners.*			*Grand Total.*
	Boys.	*Girls.*	*Total.*	*Boys.*	*Girls.*	*Total.*	
Secondary Schools	4	1	5	24	26	50	55
Central Schools	16	16	32	—	—	—	32

A similar questionnaire and covering letter was sent to these schools, so that a second and independent estimate of the pupils' intelligence, school work and character was obtained. The heads of secondary schools were also asked to say whether, in the opinion of the school, the pupil was of "scholarship standard." The estimates from secondary and central schools are necessarily only tentative, for at the time they were made most of the pupils had been in their new schools for only one term. It was thought, however, that first impressions might be helpful.

IV.—RESULTS OF THE INQUIRY INTO DISCREPANT CASES.

(*a*) *Teachers' estimates.*

An analysis of the answers to the question, "Did you think the pupil would win a scholarship?"—is given in Table II.

TABLE II.

EXPECTATIONS OF TEACHERS.

Did you think the Pupil would win a Scholarship?	*I Winners.*			*E Winners.*		
	Boys.	*Girls.*	*Total.*	*Boys.*	*Girls.*	*Total.*
Yes, certainly	6	5	11	9	7	16
Yes, probably	6	6	12	14	11	25
Yes, possibly	10	10	20	5	9	14
Doubtful	6	0	6	2	0	2
No	2	8	10	0	3	3

The scholarship examination results are obviously in closer agreement with the expectations of the teachers than are the results of the intelligence test. This is what would be expected, in view of the fact that teachers' estimates of ability are largely formed by the children's success in school work, and in examinations which resemble the scholarship examination more closely than they resemble the intelligence test.

Two-thirds of the scholarship winners were definitely expected by their teachers to gain scholarships, and only one-twelfth of them were expected not to do so.

The following table gives some idea of the first impressions made by the E winners in secondary schools :

TABLE III.

PERCENTAGE NUMBER OF CHILDREN (E WINNERS) IN THREE CATEGORIES AS JUDGED BY SECONDARY SCHOOL TEACHERS AT THE END OF ONE TERM.

	Boys.	*Girls.*	*Boys and Girls.*
Of Scholarship standard....................	42	35	38
Possibly of Scholarship standard	21	42	32
Definitely not of Scholarship standard	37	23	30

We have no unselected group of scholarship winners with which to compare the above results, but the fact that so large a percentage of the E winners can be described as " not of scholarship standard " is a clear indication that the intelligence tests do reveal a lack of intelligence, which is not revealed by the scholarship examination.

(*b*) *Handicaps and advantages.*

Intelligence tests are designed to measure inborn ability, and the results of such tests may be expected to be less affected by extraneous handicaps than the results of a scholarship examination. For example, if a child makes a low score in a scholarship examination, while the low score may conceivably be the result of a low degree of native intelligence, it may also be due, to an appreciable extent, to such extraneous handicaps as a bad home environment, a poor physique, irregular school attendance, or defects in personal character. But if a child makes a low score in an intelligence test the presumption is that, while extraneous handicaps may to a small extent be a cause, the main reason must be that the child is handicapped by a lack of native ability. Extraneous handicaps or advantages may, therefore, be a cause of the divergencies between the results of the two types of examination. It was for this reason that such questions as home conditions, health, character, and regularity of attendance at school were enquired into. The total number of extraneous handicaps mentioned in the reports was :

I winners	Boys, 38 ;	Girls, 37 ;	Total, 75.
E winners	Boys, 13 ;	Girls, 13 ;	Total, 26.

The distribution of these handicaps is given in Table IV.

TABLE IV.
DISTRIBUTION OF EXTRANEOUS HANDICAPS.

Handicapped by	*I Winners.*			*E Winners.*		
	Boys.	*Girls.*	*Total.*	*Boys.*	*Girls.*	*Total.*
Home	9	14	23	2	1	3
Health	10	8	18	5	4	9
Character	17	13	30	6	7	13
Attendance	2	2	4	0	1	1

There was, of course, considerable overlapping, some children suffering from as many as three of the selected handicaps.

The figures indicate that the I winners suffer from extraneous handicaps to a much greater extent than the E winners. The extent of the advantages of the E winners in home conditions is brought out by the figures in Table V.

TABLE V.
HOME CONDITIONS.

Homes.	*I Winners.*			*E Winners.*		
	Boys.	*Girls.*	*Total.*	*Boys.*	*Girls.*	*Total.*
Very favourable	4	2	6	2	6	8
Favourable	17	14	31	26	23	49
Tolerable	6	6	12	2	1	3
Unfavourable	3	8	11	0	0	0

Another advantage enjoyed by some of the E winners is that, being spurred on by their parents, they were anxious to win scholarships. In eight cases of E winners (four boys and four girls) the teachers specially mention that the children were ambitious. The keenness of parents about their children's success was found to be more frequent for the E winners (thirty-six cases out of sixty) than for the I winners (twenty-two cases out of sixty).

The character defects most commonly mentioned are laziness and carelessness, and they are often associated with bad home conditions and with poor health. That these defects, reported so frequently from the elementary schools in the case of I winners, are not mere excuses invented to explain non-success in the scholarship examination, is strikingly shown by the independent reports from the central and secondary schools. Among the I winners traced to central schools, the investigator had received adverse character reports from their elementary schools for nine boys and six girls. Of these, seven boys and five girls were reported on in similar terms by the central schools. Similar confirmation of the results is given by the figures in Table VI.

TABLE VI.

PERCENTAGE NUMBER OF CHILDREN REPORTED AS SUFFERING FROM CHARACTER DEFECTS.

	I Winners.			*E Winners.*		
	Boys.	*Girls.*	*Boys and Girls.*	*Boys.*	*Girls.*	*Boys and Girls.*
By Elementary Schools	57	43	50	20	23	22
By Secondary and Central Schools	55	30	42	17	12	14

V.—INDIVIDUAL CASE STUDIES.

There is considerable evidence that the tests do reveal intelligence among children who do not excel in school work. But apart from the fact that a certain standard of academic attainment is necessary at the age of eleven if children are to profit by a secondary school education, there are other reasons which make it doubtful if scholarships should be awarded on the basis of innate ability alone. If, by the age of eleven, intelligent children have failed, by reason of extraneous handicaps, to reach the scholarship standard of attainment, it is not safe to assume that they will be able to overcome these handicaps if they are transferred to secondary schools. Our results suggest that, in the groups investigated, most of the intelligent but unreliable children who have failed to respond to the teaching given in elementary schools are still unsatisfactory when they have been transferred to secondary schools or central schools. This may be most clearly shown by some concrete examples :

Violet.—Home conditions bad ; large family, mother goes out to work, nobody looks after the children ; Violet is uncontrollable at home, well-behaved at school ; when young she was very untidy in personal appearance and work ; her handwriting was the worst in the class, but she was the most intelligent ; " all through the school we knew she was intelligent " ; she had " flashes of extraordinarily good intelligence " ; " brilliant spasms " ; problem work in arithmetic was very good ; arithmetic better than composition, though in composition she would employ unusual words ; she was often kept away from school to mind the baby ; she was unreliable, coming high in class one term and low in another term ; she was not expected to win a scholarship because of her unreliability.

She came 30th in the intelligence test but 279th in the scholarship examination.

She went to a central school, where she is reported to be doing average work ; she has a " good memory but she is variable."

Mary.—She has no father and is much petted by her mother. In school she was lazy, self-satisfied and very talkative ; she was a very charming child and had as companion a much older girl whose influence was unsettling. She changed school about a year before the scholarship examination ; she was " very intelligent, taking fourth place in class, but she could easily have been second." It was thought she might possibly have won a scholarship.

She came 76th in the intelligence test but 389th in the scholarship examination.

She obtained a free place in a secondary school, where she is reported to be doing average work, showing " a certain superficial brightness " ; she is " fairly quick, but has not much perseverance or tenacity " ; she is " not up to scholarship standard."

John.—Home conditions bad. He appeared to have " good average intelligence," was " clean and tidy," and a " pretty good worker." He was not expected to win a scholarship.

He came 50th in the intelligence test and 267th in the examination.

He went to a central school where, though he is " very quick and bright, none of his work is really good." He is described as " a typical boy of the streets, lazy, careless, needs watching ; speech and manners anything but refined."

Richard.—Home conditions favourable. Reported to be of good intelligence ; " he gave oral answers above average " ; was particularly good at composition. He was inaccurate and excitable in the boys' school. The infants' head mistress reported that " you had to stand behind him to get him to do anything " ; they had " a struggle to teach him to read," but they thought he had possibilities, as he did not lack ability so much as power of concentration.

He came 92nd in the intelligence test and 507th in the examination.

He obtained a free place in a secondary school, where he is reported as being "scatter-brained," "lazy," and "not very willing to concentrate."

Some of the worst cases did so badly in the scholarship examination that they were not eligible for central schools, e.g.:

Norah.—Home conditions exceedingly bad. There are ten children, and the mother is described as lazy. Norah is one of the worst kept girls in the school; in the lower school her composition was good and she was looked on as a possible "scholarship girl." But as she got older her work became "slapdash, and her composition was often full of careless mistakes. She is good at arithmetic."

She came 62nd in the intelligence test and 628th in the examination.

She has remained in her elementary school.

James.—He has no father; his mother is a flower seller and his home conditions are bad. He was "very bright when younger" and used to answer well. He was moved up into Standard 5 to be ready for the scholarship examination, but now he is spasmodic, "one day as dull as ditchwater, another day as bright as can be." It was thought he had a good chance of winning a scholarship despite his handicap, but his mother said she would not allow him to go to a central or secondary school.

He came 32nd in the intelligence test and 643rd in the examination.

He has remained in his elementary school.

The above examples are children who are suffering from handicaps of a more or less permanent character. Nothing short of removing the children to a boarding school would enable them to overcome their difficulties, for the continuous bad influence of their homes must inevitably keep them down and ingrain still more deeply the weaknesses of character which have already developed. It is too much to hope that these children could at any day school work up to, or even near to, the full limit of their intellectual capacity.

The intelligence tests do, however, reveal children who fail to win scholarships because they are suffering from the effects of some extraneous handicap of a more temporary kind than bad home conditions. A child may, for example, suffer from an illness at a crucial time in her school career. The following cases are illuminating:

Elsie.—Her home conditions were good and one sister had won a scholarship. Elsie was a steady worker; she had initiative, and while not brilliant, she was keen on new ideas, and very good at arithmetic; her composition was medium and she was weak at spelling. When she was about eight she developed diphtheria; next year she had scarlet fever. She was then discovered to be a germ carrier and was absent from school for a further long period. She missed much of the groundwork, and her head mistress thought "it was remarkable that she kept her place" in class, for she was always first or second. She was more intelligent than another girl from her school who won a scholarship.

She came 25th in the intelligence test and 295th in the examination.

She went to a secondary school as a fee-payer ; no report on her progress has been received.

Edward.—Home conditions favourable. Edward was reported to be " keenly and finely intelligent," " hardworking and highly nervy." He was very good at English. He developed diphtheria, followed by whooping-cough, and then he broke his arm—all during the eighteen months before the scholarship examination. But for this series of illnesses the head master would have regarded him as a certain scholarship winner ; as it was he considered his chances quite good. A less intelligent boy from the same school won a scholarship.

Edward came 63rd in the intelligence test and 201st in the examination.

He obtained a free place at a secondary school, where he is reported to be of " good intelligence, very keen, rather nervy, up to scholarship standard, but handicapped by absence."

The following case is interesting because it illustrates a temporary handicap of an exceptional kind :

Mary.—Home conditions good, mother the widow of a Welsh minister. Mary was reported to be of very good intelligence, but " distinctly lazy," " one of those annoying children you feel can do better " ; she had a " good opinion of herself " ; had " to be pushed every step " ; socially she was much above the other children at her school ; she speaks Welsh but is shy about it ; she could not speak English very well when she entered school and she was backward in the lower classes ; oral work was better than written.

She came 30th in the intelligence test and 895th in the examination.

She went to a central school, where she is doing good average work ; she is good at arithmetic and geography, average in English and variable in industry.

Many of the cases of laziness and carelessness appear to be chronic. Richard, for example, was lacking in concentration in the infants' school, in the boys' school and in the secondary school. Much laziness is doubtless due to the continuous bad influence of the children's homes ; in a few cases the influence is bad because of over-indulgence, in the others because of excessive neglect. In some cases, too, hereditary predisposition in the form of a phlegmatic or a sanguine temperament may play its part. But the question remains—how far is it possible to cure laziness and carelessness by suitable treatment in school ?

We have so far discussed cases of intelligent children who, as a result of permanent or temporary extraneous handicaps, are not brought to light by examination, though they are discovered by intelligence tests. There is another type of case, that of relatively unintelligent children who, possibly as a result of special advantages, do well in the scholarship examination, but the fact that they have only mediocre intelligence is revealed by the intelligence tests. The following are examples :

Emily.—Home conditions very good ; father a civil servant, is very strict and has insisted on homework from an early age and has helped Emily with it ; she " put in a tremendous amount of work " and we felt she had earned the scholarship, though the award was " the biggest surprise we've had." (Many children win scholarships from Emily's school.) She always appeared slow and was generally nearer the bottom than the top of her class ; she had diphtheria six months before the examination and appeared to be brighter when she came back from hospital.

She came 620th in the intelligence test and 63rd in the examination.

No report from secondary school.

Arthur.—Home conditions good ; average intelligence, sound but not brilliant ; not expected to win a scholarship ; Arthur's teacher was " astonished," for two boys in the class who failed to win scholarships were more intelligent ; Arthur worked very hard, English being his best subject ; he was a sensitive boy, very ready to cry.

He came 743rd in the intelligence test and 73rd in the examination.

His secondary school reports that he is average. At the end of his first term he was bottom of his class of thirty-four pupils. New subjects are weak and he worries about his work. He is not of scholarship standard, though he is sometimes quite bright in oral work, and there are signs of great improvement.

Florrie.—Fatherless ; mother, who is very keen for Florrie's success, goes out to work ; Florrie is very serious for a child, a " little mother " to her two younger sisters ; reads a good deal and is not fond of play, would do homework before anything else ; she is very steady and dependable ; she was good at problems, but she had to ponder over them ; she was not expected to win a scholarship, but " we thought that by sheer hard work she might get through ; ' if the questions suited her she would do well."

She came 766th in the intelligence test and 59th in the examination.

Her secondary school reports that she is below scholarship standard.

Reference to Table IV shows that a rather high percentage (30) of the E winners are reported by their secondary schools as being definitely not of scholarship standard. There appears to be no doubt that intelligence tests do reveal in many pupils a lack of intelligence which, owing to special advantages which these pupils enjoy, is not discovered by the scholarship examination.

At the same time, it cannot be claimed that intelligence tests give no wrong measures of intelligence, and owing to limitations of time, it has not been possible, in this investigation, to form any estimate of the relative reliability of the two types of examination. On theoretical grounds, the intelligence test, with its many little questions and the possibility of greater objectivity in marking, should be superior. Some of the E winners who are reported by their schools to be highly intelligent did, however, fail to do well in the intelligence tests, and it must be admitted that such cases are puzzling. The following is an example :

Daisy.—An only child from a very good home ; parents are " well off," but Daisy is not spoilt. She is described as " a remarkable girl " with " a remarkable mathematical brain," " one of the best all-round girls the school has had." She reads voraciously ; her compositions are full of very good ideas, well-expressed ; she was, however, an extraordinarily bad speller. She was very adaptable, never lost her head, worked seriously and well of her own initiative. She was in the top class of an unreorganised school, and she was looked upon as a certain scholarship winner.

She came 428th in the intelligence test and 11th in the examination.

Her secondary school reports that she is quite satisfactory, her oral work being better than her written work, which is spoiled by bad spelling.

The truth appears to be that a number of children, for various reasons, are bound to fail to do themselves justice in any type of examination. The following case illustrates the kind of mischance which may mar the findings of an intelligence test :

Margaret.—Home conditions very good, parents keen and intelligent. Margaret is described as exceedingly intelligent ; very good at arithmetic and composition ; a great reader, precocious ; she was a hard worker, " her most striking characteristic was her ambition " ; she was " pushed and helped " at home ; she was " nervous but generally had her feelings well under control " ; her teacher reported that she was " very easily unbalanced."

After the above reports had been obtained, the investigator told the head mistress that Margaret had done badly in the intelligence test.

She came 899th in the intelligence test and 74th in the examination.

The head mistress then remembered that she had invigilated when the test was given, and that Margaret had sat in the front row near to her. When the candidates were told to turn over and begin Test 2 Margaret was very disconcerted to see she had not finished Test 1—" She looked at me in alarm. I have never seen a look of alarm so clearly marked. It was the only time I've ever seen her put out."

Her secondary school reports that she is quite satisfactory ; " she works hard on the whole," " spells badly " ; is of " good intelligence."

VI.—CONCLUSIONS.

A.—It is clear that for success in secondary school work several conditions are necessary. They may be summarised as follows :

(1) A good degree of innate intelligence.

(2) A certain standard of academic attainment on entry.

(3) Some sturdiness of character, preferably combined with physical vigour and satisfactory home conditions.

B.—The results of the present investigation suggest that in extreme cases:

(*a*) It is possible for children of the requisite degree of intelligence to fail to reach the necessary standard of attainment by the age of eleven, and that in such cases the innate intelligence can be revealed by intelligence tests, though it remains undetected by the scholarship examination.

(*b*) It is possible for children of eleven to reach the scholarship standard of attainment, although they do not possess the degree of intelligence normally required for winning scholarships, and that in such cases the lack of innate intelligence can be revealed by the intelligence tests, although it remains undetected by the scholarship examination.

(*c*) Where an intelligent child fails to win a scholarship a common cause is that the child is suffering from one or more of the following extraneous handicaps: (i) bad home conditions; (ii) some defect of character, e.g., laziness, carelessness, lack of concentration; (iii) poor health; (iv) irregular attendance at school. (The failure to win a scholarship may in isolated cases be due to the fact that the child has not done himself justice in the scholarship examination.)

The handicap of specially ineffective teaching in school may also be a factor. Cases were met with among the I winners in this investigation where a child had moved from school to school, or where a child had been taught by a succession of supply teachers.

(*d*) Where a child of only ordinary intelligence succeeds in winning a scholarship, a common cause is that the child enjoys one of more of the following special advantages: (i) good home conditions; (ii) some merit of character, e.g., ambition. (A scholarship winner may in isolated cases fail to do himself justice in an intelligence test.)

The advantage of specially good preparation in school may also be a factor, though it was not possible in this investigation to prove that this was a major cause in any particular case.

C.—Where intelligent children fail to win scholarships, owing to defects of character, such pupils appear still to be unreliable after being transferred from an elementary to a central school (see Table VI, page 228). It is desirable to " follow up " these children during their central school careers with a view to seeing whether character defects developed by the age of eleven are permanent. It is reasonable to suppose that, since most of these defects in the extremely bad cases are presumably the result of permanently bad conditions beyond the influence of the schools, the chances of their disappearing are small.

D.—Of the two methods of selection, the scholarship examination gives results which are in closer accordance with teachers' expectations than are the results of intelligence tests (see Table II, page 225).

E.—The results of this investigation confirm the view, now generally accepted by psychologists,* that neither an intelligence test nor the customary examination is, by itself, a satisfactory method of selecting children for secondary schools, but that a carefully constructed intelligence test should be added to the usual type of examination in English and Arithmetic.

RÉSUMÉ.

DES ÉCARTS ENTRE DEUX RÉSULTATS D'UN TEST ET D'UN CONCOURS D'ADMISSIBILITÉ AUX ÉCOLES SECONDAIRES.

Les recherches se basent sur la comparaison des résultats d'un concours de bourse en anglais et en arithmétique avec ceux d'un test d'intelligence par groupes. Les sujets étaient 2,000 enfants de Londres entre les âges de dix ans six mois et onze ans. La corrélation entre les résultats des deux types d'épreuve étaient d'environ .6. Il y avait, cependant, des écarts frappants. Quelques enfants réussissaient très bien au concours et échouaient au test, et vice versa. Une enquête sur 120 de ces cas révéla le fait que quelques enfants intelligents ne gagnent pas de bourse parce qu'ils souffrent des désavantages extérieurs, tels des conditions défavorables à la maison, des défauts de caractère, une santé affaiblie, une maladie vers l'époque du concours. D'autre part quelques enfants de capacité médicocre gagnent une bourse parce qu'ils jouissent d'avantages spéciaux correspondants. La conclusion qu'il faut en tirer c'est qu'il vaudrait mieux ajouter au concours ordinaire en anglais et en arithmétique un test d'intelligence.

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* *See*, for example : C. W. VALENTINE, *The Reliability of Examinations* (Univ. of Lond. Press, 1932).

In this book (pages 97-100) Professor Valentine reviews the results of research into the use of intelligence tests in entrance examinations, and concludes that " on the whole it seems safe to say already that the combination of written examinations plus carefully selected intelligence tests is likely to supply a more reliable means of selecting pupils for secondary schools at 11+ than will the examinations alone."

See also :

A. DONALD AMOS, *Examination and Intelligence-test Forecasts of School Achievement.—Brit. Journ. of Educ. Psych.*, 1931, Vol. I, page 73.

J. W. COLLIER, *The Predictive Value of Intelligence Tests for Secondary Education.—Brit. Journ. of Educ. Psych.*, 1933, Vol. III, page 65.

J. B. RUSSELL, *The Relation of Intellectual, Temperamental and other Qualities to Success at School—A following-up Enquiry.—Brit. Jour. Psych.*, 1934, Vol. XXIV, page 295.

ZUSAMMENFASSUNG.

WIDERSPRÜCHE ZWISCHEN DEN ERGEBNISSEN VON INTELLIGENZPRÜFUNGEN UND AUFNAHMEPRÜFUNGEN AN HÖHEREN SCHULEN.

Die Untersuchung basiert auf einem Vergleich der Ergebnisse einer Stiftungsprüfung im Englischen und im Rechnen mit den Resultaten eines Gruppenintelligenztests. Die Vp. waren 2000 Londoner Kinder zwischen 10 Jahren 6 Monaten und 11 Jahren. Die Korrelation zwischen den Ergebnissen der beiden Prüfungstypen war ungefähr ,6. Trotzdem fielen einige Widersprüche auf, denn einige Kinder schnitten in der Schulprüfung sehr gut und in der Intelligenzprüfung sehr schlecht ab, und umgekehrt. Eine Nachfrage bei 120 von diesen Fällen zeigte, dass einige intelligente Kinder keine Stipendien gewinnen, weil sie an Nachteilen ausserhalb der Schule, z. B. an schlechten Familienzuständen, Charakterschwächen, unbefriedigender Gesundheit, Krankheit, zur Zeit der Prüfung leiden. Umgekehrt gelangen einige Kinder mässiger Intelligenz zu Stipendien, weil sie gewisse entsprechende, besondere Vorteile geniessen. Daraus schliesst man, dass es wünschenswert wäre, der gewöhnlichen Stipendiumsprüfung eine Intelligenzprüfung hinzuzufügen.

AN ENQUIRY AS TO REASONS FOR THE CHOICE OF THE TEACHING PROFESSION BY UNIVERSITY STUDENTS.

By C. W. VALENTINE.

I.—*Importance of the question.*
II.—*Description of the enquiry.*
III.—*Note on the questionnaire method.*
IV.—*Reports as to original motives.*
V.—*Motives at the time of entering the profession.*
VI.—*Reasons against entering the teaching profession.*
VII.—*Summary of results and conclusions.*

I.—IMPORTANCE OF THE QUESTION.

THERE have been in recent years a considerable number of enquiries as to the qualities that are thought to be important for teachers, and attempts have been made to devise means of estimating teaching ability.* Less attention has, however, been paid to the question as to the reasons which influence young people in choosing the teaching profession, though these influences provide us with the material for the teaching profession, from which our selection has to be made.†

The question as to what motives are most influential is important for various reasons :

(*a*) It is a matter of concern as to whether the main motives are of a type calculated to bring forward those best suited for the profession.

(*b*) It is useful to know which motives are most influential if it is desired at any time to increase somewhat suddenly the number of entrants to the profession.

(*c*) There has been much discussion as to the desirability of " equal pay " for men and women, or the necessity of higher salaries for men in order to attract men as good as the women entrants. As a preliminary to this aspect of the discussion it is important to know the extent to which young men and young women respectively find the existing salaries attractive.

(*d*) The question arises as to whether undue pressure is put upon some young people by either parents or teachers to induce them to take up a teaching career. Thus, for example, the late Mr. Spurley Hey, when Director of Education for Manchester, expressed the opinion that the greatest influence over the pupil when making a decision to enter a Training College is the Head Teacher of the Secondary School, and that in the consideration of the choice of a profession undue importance is attached to the purely intellectual qualities—"that this indeed was the outstanding factor between teaching for Secondary Schools and teaching for Elementary Schools, intellectual mediocrity being good enough for Elementary Schools."*

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* See *The Assessment of Teaching Ability*, by R. B. Cattell, in this *Journal*, 1931, Vol. I, p. 48. The author appends also a bibliography of the subject.

† I shall refer later to a paper by Mrs. F. M. Austin on the motives of school pupils who wished to enter the teaching profession, published in this *Journal*, 1931, Vol. I.

(*e*) One further question is important in reference to students in University Education Departments. How far are young people tempted by the Board of Education grant, which gives them an opportunity of a University education, to adopt the teaching profession chiefly to ensure a University career? Some University teachers and others have felt that this in itself is a considerable influence and that it is not a satisfactory reason for choosing the teaching profession.

The proposal has indeed been made that no grants of this kind should be given to students for the years of the University Degree Course but that larger grants than the present ones should be offered for the post-graduate years of training. This plan, it is pointed out, would defer the necessity for the choice of the profession until the young person was more mature and it would eliminate the temptation to choose teaching chiefly for the sake of gaining a University education.†

Obviously a point very relevant to this proposal is whether, in fact, the Board of Education grant is of great influence on the choice of the teaching profession.

II.—DESCRIPTION OF THE ENQUIRY.

In view of the importance of these questions I thought it worth while to try to ascertain the chief motives in choosing the teaching profession which influenced students in the Education Departments of various Universities. The students were asked to report upon the motives which had influenced them originally, and also on motives acting at the present time.

The enquiry was made among graduate students in Education Departments, most of whom had made the decision to become teachers before leaving school, and had entered the Education Department when they entered the University. (The students in the first experimental enquiry in 1921-1922 were only in the second year of their degree courses:

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* *Some Influences upon the Supply and Training of Teachers.*—Education Pamphlets, No. 1. Councils and Education Press, London. (Reprinted from *Education.*)

† The proposal was raised at the Conference of the Universities held at Liverpool in a discussion opened by Sir Charles Grant Robertson (see report of the Annual Conference, 1928, published by Universities Bureau of the British Empire) and was received in somewhat sympathetic manner by the then President of the Board of Education.

their results are not added to the final figures.) Any conclusions we may reach need not apply to students at two-year Training Colleges; it is hoped that an enquiry into the motives of such students may be published later, either by myself or a colleague.

The first enquiry was made for experimental purposes in my graduate class at Birmingham University in the year 1921-1922, and the second in 1925-1926. The questionnaire having been definitely improved in the light of this experience, it was also applied in its final form in the year 1932-1933 in the Universities of Birmingham, Leeds, Sheffield, and in the University College of Newcastle-on-Tyne. My thanks are due in this connection to Professors Frank Smith, John Strong, and G. H. Turnbull, for their kindness in having the questionnaire submitted in their Departments.

In the earlier enquiries in Birmingham the method of procedure was as follows: The students were first asked to state the reasons that had chiefly influenced them in the choice of the teaching profession made while they were still at school. Their reports, like all answers in this enquiry, were anonymous. This anonymity is imperative if one is to avoid the temptation to put forward chiefly laudable motives.*

These preliminary spontaneous reports were then collected, and a list of possible motives (based on the students' own reports) was written on the board, further suggestions and comments being invited. Students were now asked to select from this wide list any motives which had influenced them, numbering them in the order of the strength of that influence, 1, 2, 3, etc. They were also asked to state any reasons against the choice of teaching as a profession. Students were previously asked to adopt some *nom de plume*, and to write it on both the reports so that they could be attributed to the same student. It was thought that though the first method would have the advantages of spontaneity, and would avoid any possibility of suggestion, the second would have the advantage of recalling various motives to mind which the student might for the moment overlook. As a result of discussion with students and of comparison of the results of the two methods, I came to the conclusion that the second method was the better, though, as will be shown, no great differences appeared as regards the most influential motives according to the methods used. In the light of preceding experience, the accompanying questionnaire was drawn up, and this was used in the last Birmingham enquiry (1932-1933), and in the enquiries in the other three Universities (except that the "Reasons Against" were not tabulated for the Birmingham students).

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* In a report of a somewhat similar enquiry given by Dr. W. Schohaus in his book *The Dark Places of Education* (Allen and Unwin, 1933), no reference is made as to whether the reports were anonymous, which greatly weakens the cheerful conclusion that material motives were not the chief ones (p. 85).

QUESTIONNAIRE.

MOTIVES FOR CHOICE OF TEACHING PROFESSION.

(Name need not be given.)

Date..

Sex ....

Degree obtained :
Degree :
University :
Subject :
Class :
(if in honours.)
Year :

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(1) Number the motives given below with figures, 1, 2, 3, etc., in the blank columns provided so as to indicate the strength of the influence of such motives on :
(*a*) Your *original* choice of the teaching profession ;
(*b*) Your *present* choice of the teaching profession.
If one of the given motives had (or has) no influence, leave the corresponding space blank. If any motive not mentioned had any influence, write it down after the given motives, and indicate its relative influence as for the other motives.

	Original motive.	*Present motive.*
Board of Education or other grant giving chance of university education		
*Economic desirability of teaching profession		
Stop gap—while looking round or waiting for stronger interest to develop		
No prospect of any alternative career		
Parent's wish		
Deliberate influence or persuasion of one of your own teachers		
Influence of a teacher (unknown to him or her) who was greatly admired		
Fondness for children		
Ideals—e.g., possibility of influencing young people		
Feeling of special fitness or capacity for the work of teaching		
Enjoyment of feeling of leadership or power		
Liking for teaching, more general or vague than the two preceding reasons		
Interest in education, distinguishable from the preceding		
Desire for profession in close association with favourite studies		
Social status of profession		
The long vacations		
Inability now to change profession. (In list of present-day motives)		

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* This was taken to include security as well as adequate salaries. It was decided that it was difficult to separate these two in considering the economic motive for choosing the profession.

MOTIVES FOR CHOICE OF TEACHING PROFESSION—*continued.*

(2) Was your father a teacher ? ....

Was your mother a teacher ? ....

(3) Did you enter the Education Department on first coming to the University .... Yes/No.

Or after taking your degree.............................. Yes/No.

(4) Give your approximate age when you finally decided to adopt the teaching profession ....years.

REASONS AGAINST CHOICE OF TEACHING PROFESSION.

(5) Number the reasons given below with figures, 1, 2, 3, etc., in the column provided, so as to indicate your opinion of their relative weight as reasons *against* the adoption of teaching as a profession. If any of the reasons given seem to you unimportant or invalid, leave the corresponding spaces blank. You can add to the list any further reasons which you consider of importance, indicating their weight with figures as above.

Salaries unsatisfactory	....
Small prospects of promotion	....
Long and expensive training	....
Hard work and mental strain in teaching	....
Monotony of work	....
Low standing of profession in public mind	....
Little scope for self-development	....
Isolation from adult society	....
Teachers get into a rut, tend to dogmatize, domineer, etc.	....
Activities restricted by examination fetish	....
Deficiency of education authorities, e.g., red tape, false economy, etc.	....
Necessity for subordination to erratic " heads "	....
Bickering amongst school staff	....
Small chances of marriage	....
Women teachers dismissed after marriage	....
....	....
....	....
....	....

(6) Add any comments you may think fit relating to any section of this questionnaire.

As already indicated, the first two applications of the enquiry were experimental in nature; the various motives were discussed with students after they had answered the questions, and items in the questionnaire were added at their suggestion, and some too general expressions were replaced by more specific terms, others being more precisely defined as the result of these discussions. As the number of students in the two experimental years was small, and economic conditions when the first group would make their choice were abnormal, and as the questionnaire was different for them, the results will not be added to the main results, nor shall I give full details for these early years; they agree, however, substantially, as far as they go, with the main results, except in one or two interesting respects to which special reference will be made.

As there was no material difference between the four universities in the results of the final questionnaire (apart from one striking point which will be mentioned), these results can be massed together, and give us the reports of 348 students.

III.—NOTE ON THE QUESTIONNAIRE METHOD.

A word may be said here about the method of the questionnaire. This method has been abused in both senses of the word. It is, indeed, liable to lead to very misleading results if not used with discretion and if the results are not interpreted with caution. In particular, it is apt to involve the fallacy of selection. For example, a recent widespread questionnaire issued by a popular journal as to religious beliefs was liable to produce replies only from those who have very strong religious beliefs or are intensely antagonistic to religion. The large number of persons included between these two extremes might be very little represented. Again, to enquire as to the relative appreciation of (*a*) broadcast music, or (*b*) broadcast lectures among University students only would obviously not be representative of the community as a whole, and some questionnaires on educational questions have suffered from this type of weakness. On the other hand, sweeping criticisms of the questionnaire, when carefully used among persons who are capable of intelligent interpretation of its purport and of the terms used, are, I think, ill-judged. To criticise it, for example, as is done by Dr. Flexner,* because words never mean precisely the same things to different persons, is surely absurd. The same objection would apply strictly speaking to any discussion by word of mouth. True, in the latter case, differences can be lessened or explained by prolonged discussion : but so they can before a questionnaire is submitted to an assembled group of people, as was done in the present enquiry, with the experimental groups. On the other hand, if discussion is prolonged with individuals, what is gained in more exact definition may be, in some types of enquiry, more than lost by the limitation of the number of persons whose opinions can be gathered in the time available.

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* In his *Universities, American, English, and German.*—Oxford University Press, 1930.

Sometimes an indifference to or impatience with the questionnaire method may result in the formation of opinion on the reports of a few individuals with whom the person himself happens to come into contact.

In our own particular enquiry I should be fully prepared to admit that different students would interpret somewhat differently a few phrases in our questionnaire, especially the heading " Ideals, e.g., the possibility of influencing young people." They may also have different reasons for feeling "special fitness or capacity for the work of teaching;" but surely at least a mere surmise based on communication with a dozen or so students as to the influence say of a Board of Education grant on attracting students who would not otherwise wish to enter the teaching profession, or as to the influence of an increased salary, is far less reliable, as an estimate of general conditions, than the report of some hundreds of students as to the influence of these motives on their own choice of the profession of teaching. Even in reference to ideals, if different factors may be involved, surely a graduate student should be able to understand the various kinds of ideals that can be legitimately included under this heading. Errors may no doubt be made in comparing the relative strength of some motives. But at least a strong motive is not likely to be equated with a very weak one ; and as will be seen later, motives which appear very near to one another in a student's reply score almost the same. Furthermore, in this paper small differences in numbers will not by any means be stressed, and inferences will be made cautiously.

No doubt again some unconscious motives would be at work ; but few, I think (except those who hold the extreme view that our actions and choices are almost entirely decided by unconscious motives and that our own considered decisions and judgments are of little importance), will doubt that the choice of a profession can be, and is, regularly influenced by conscious motives. It would surely be absurd to suggest that the raising of teachers' salaries and the decline in the number of good positions in other professions and industries have not been main factors in causing the great increase in the number of applicants for the teaching profession since the war.

Again, a considerable number of our replies indicate that the student is going unwillingly into teaching. Thus one writes: " After having obtained a degree in Chemistry, I saw no possibility of getting a post as a chemist, so decided to stay on another year, do Education and become a teacher, possibly, although I would still rather be a chemist." Whatever unconscious motives may be behind this antipathy to teaching, it is surely a plain fact of importance, and one that we cannot possibly know apart from the student's own report.

Incidentally, the idea of unconscious or at least dissociated motives is now spreading among students generally, and they are apt to be on the lookout for them. Thus a student writes: " I have had an inferiority complex all my life and I want to work it off by doing things for children."

I was also impressed by the number of students who spontaneously referred to the enjoyment of the exercise of power in teaching; and personal prejudices may not be overlooked, for example by the student who wrote: " It was taken for granted at school that I should teach—since I was always near the top of the class (12-13 years), and, being conceited, I liked the idea. I thought then I was clever."

This suggests a further advantage of the questionnaire method when it is anonymous. A person is much more likely to be frank when writing anonymously than when talking face to face with an investigator.

Finally with all its ambiguities and difficulties it must be remembered that the alternative, in matters of the kind dealt with in this enquiry, is merely personal surmise based usually upon impressions gained from a very few individuals.

IV.—REPORTS AS TO ORIGINAL MOTIVES.

It will no doubt be felt that the motives which led to the original choice of the profession are the more important ones as the students can hardly, at the end of their University career or halfway through their training, choose another profession. We will deal, therefore, with the " original motives " first. These are summarized in Table I.

As to the age at which the decision was made to become a teacher, the reports show:

(1) That 16 is the most frequent age for men and women (26 per cent).

(2) That 56 per cent make the choice during the ages 15, 16, and 17.

(3) That only 18 per cent of the men and 7 per cent of the women made the decision at an age above 19.

Some students say that the *desire* to become a teacher appeared at a much earlier age than the age of decision.

A word must be said as to the method of scoring. The motive which was marked by the student as first was given 9 marks, the second one 8, the third 7 and so on. Thus a student who marks many motives weakens the *relative* score of his first motives. In each table the percentage score given is the percentage of the maximum possible score.

TABLE I.

ORIGINAL MOTIVES.

MEN AND WOMEN. ALL FOUR UNIVERSITIES.

Motive No.	*MEN.* *Number of Students* : 195.	*Percentage Score.*	*Rank.*
I.	Economic desirability	50	1
II.	Board of Education Grant	47	2
III.	Interest in favourite studies	45	3
IV.	General liking for teaching	41	4
V.	Parent's wish	30	5½
VI.	Long vacations	30	5½
VII.	Feeling of special fitness	28	7
VIII.	Social status	25	8
IX.	Influence of admired teacher	22	9
X.	Ideals	21	10
XI.	No alternative prospect	19	11½
XII.	Fondness for children	19	11½
XIII.	Enjoyment of power	16	13
XIV.	Persuasion by teacher	14	14½
XV.	Interest in education	14	14½
XVI.	Stop gap	11	16

Motive No.	WOMEN. *Number of Students* : 153.	*Percentage Score.*	*Rank.*
III.	Interest in favourite studies	61	1
IV.	General liking for teaching	58	2
XII.	Fondness for children	43	3
I.	Economic desirability	39	4
II.	Board of Education Grant	33	5
V.	Parent's wish	30	6
X.	Ideals	26	7
VI.	Long vacations	25	8
IX.	Influence of admired teacher	23	9
VII.	Feeling of special fitness	22	10
XIII.	Enjoyment of power	19	11
VIII.	Social status	18	12
XV.	Interest in education	17	13
XIV.	Persuasion by teacher	15	14
XI.	No alternative prospect	10	15
XVI.	Stop gap	4	16

On the average students mentioned half a dozen motives as having influenced them. In addition to the order based on this method of scoring we give below Table II showing the frequency with which the various motives were listed as the *chief* influence. This constitutes a useful check upon the scoring method.

TABLE II.

ORIGINAL MOTIVES.

FREQUENCY WITH WHICH MOTIVES ARE PUT FIRST.

Rank.	MEN.	*Frequency with which motive is put first.*
1	General liking for teaching	32
2	Interest in favourite studies	26
3	Board of Education grant	25
4	Economic desirability	22
5	Parent's wish	17
6	No alternative prospect	15
7	Feeling of special fitness	13
8	Unconscious influence of admired teacher	12
9	Persuasion by teacher	9
10	Stop gap	7
	Ideals	7
12	Fondness for children	6
13	Long vacations	2
14	Enjoyment of power	1

Rank.	WOMEN.	*Frequency with which motive is put first.*
1	General liking for teaching	43
2	Interest in favourite studies	39
3	Ideals	14
4	Fondness for children	12
5	Parent's wish	9
6	Board of Education grant	7
	Feeling of special fitness	7
8	Economic desirability	5
	Persuasion by teacher	5
10	No alternative prospect	4
11	Enjoyment of power	3
12	Influence of admired teacher	2
13	Interest in education	2
14	Long vacations	2

Observations on the Original Motives.

One thing is emphatically brought out by these first results. According to the reports of these students themselves persuasion on the part of teachers so far from being the chief influence is one of the smallest, coming fourteenth in rank with both men and women. Table II also shows that this motive is only put as the chief original motive by 9 out of 195 men and 5 out of 153 women. Even if we include with this motive the unconscious influence of some admired teacher we find that among all these 348 students such unconscious influence or persuasion of the teacher is only put first 28 times; and the addition of the two types of motives only brings them, by the scoring method, to fifth place among the men and fifth place among the women. Thus there seems to be no justification for Mr. Spurley Hey's assertion that the Secondary School Head is the chief influence in sending pupils into the teaching profession.

Further evidence can be cited on this point. Following an enquiry we had made as to the reasons for the choice of occupation among Secondary School pupils,* Mrs. F. M. Austin selected for further analysis the motives of those adolescents who chose teaching as their profession. In an account of this she gives a table showing the percentage of children who mention various motives.† In that table references to the influence of relatives and teachers are added together. I have managed to secure a further analysis of these reports, considering only the children of sixteen years or over; from our present point of view the younger children are hardly of any importance, as their choice of a profession is very apt to change later.

This further analysis gives us the following figures:

Number of Children Traced: 79.

Father's influence mentioned 42 times (53 per cent).
Mother's influence mentioned 40 times (51 per cent).
Teachers' influence mentioned 18 times (23 per cent).

Thus we see that among these young people also the teacher's influence is decidedly less than that of either the father or mother, and the percentage is far less than that attached to the motive "Fondness for the School Subject" (40 per cent) among the children of all ages.

These reports then of the senior pupils of the Secondary Schools at a time when they were choosing the profession bear out our own figures given above.

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* See *The Forum of Education*, 1927, Vol. 5, No. 2, p. 85.

† See her article in this *Journal*, 1931, Vol. 1, p. 89.

On the other hand, there are evidently a few schools where there is pressure put upon pupils to become teachers. Thus one woman student writes : " Everyone in the Secondary School I went to was pressed to take up teaching." But this would seem to be rare. Furthermore, our results naturally cannot include those who have been effectually *dissuaded* by their teachers from entering the profession, though one or two report that they did so in spite of a teacher's efforts to dissuade them.

The influence of parents on the choice of the profession may be considered next. In Table I it will be seen that the " parent's wish " comes only sixth with the women and is bracketed fifth with the men. It is, however, given as the chief motive by seventeen men and nine women (see Table II)*; and though, as a father, I do not ignore the value of a parent's special knowledge of a child as a factor in vocational guidance, I question whether the situations suggested by such reports as the following are satisfactory :

> " The suggestion came from mother that I should take up teaching. She did not, I think, consider another profession seriously on my behalf, and I have great faith in her judgment."
>
> " I was intended either for the Church or teaching profession by my family."

Sometimes the father's wish is prompted by a desire to see the child better placed then he was ; thus :

> " My father was determined to educate me to avoid his class of work." (The father was a manual worker under bad conditions.)

At times a student reveals a consciousness that he has been forced into the profession by the parents, and still retains his antipathy to it ; thus :

> " The teaching profession was chosen for me because it seemed, I suppose, the best and safest for a woman. I grew up with the knowledge that I ' should be a teacher ' and had no reasons for wanting to. In fact I decided that I did not want to teach as soon as I was old enough to think much about it."

It is possible that the parent's influence on the decision was sometimes greater than the student realized. Repressions and rationalizations would I think be more frequent in connection with this motive than with any other.

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* With the 1925-26 group of students at Birmingham, parents' influence appeared first somewhat more frequently, namely with 5 out of 32 women, and 3 out of 30 men. The number of motives listed was only 13 instead of 16 as for later years, but they included all the main motives.

A special note may be added in reference to the 52 students, one or both of whose parents were teachers. Among the 19 whose fathers were teachers, 4 put " parent's wish " as the first motive ; 4 put it second ; and most mentioned it as one motive. Of the 45 whose mothers were teachers, 5 put the "parent's wish" first, 7 put it second, and others mentioned it as a motive. Among students who have at least one parent who is a teacher, the parent's wish appears as the main motive more than twice as often as with the rest of the students.

Here again we inevitably have excluded from our data those young people whose teacher-parents dissuaded them from becoming teachers.

Among the men, economic desirability appears as the weightiest motive followed very closely by the influence of the Board of Education grant, and interest in their favourite studies. One may expect that a young man will naturally consider economic prospects, and one can hardly criticize him for being influenced so much by this motive, which incidentally is not mentioned as the first main motive so frequently as are " General liking for teaching," " Interest in favourite studies," and " Board of Education grant." It is notable further that " economic desirability " comes first only in the Newcastle area—the worst hit by bad trade. It is the big difference between the marks for this and the next motive at Newcastle that is responsible for putting it first in the total, the motive coming second at Sheffield and third in Birmingham and Leeds.

Here I may mention also one main difference between the results of the earlier experimental enquiry in 1921-22, and those of 1932-33 in Birmingham. Only seven out of twenty-eight men (one quarter) in the earlier year mention spontaneously economic desirability : while in 1932-33 nearly one half do so (twenty-six out of fifty-five). The 1921 group would make their choice before the introduction of the Burnham scale of salaries.

It is deplorable that among the men the second most important motive, according to the weighted scoring method, and the third motive most frequently put first, is the Board of Education grant, which affords a student an opportunity of a university eduation. This position is taken in spite of the fact that one-third of the men had no grant for their degree course. Omitting these we find that this motive is put first by 25 out of 128 men ; and this puts it, taken as a percentage, at the top of the list. A similar proportional reckoning would put the weighted scores of this motive also easily first with a score of 70 per cent. This motive was also definitely first, by the scoring method, among the 30 men of the 1925-26 group in Birmingham. These facts indicate that the most powerful motive among those entering an Education Department at the beginning of their degree course is a wish for the Board's grant in order to obtain a university education. Sometimes this is quite unblushingly stated, thus:

> "I entered the Education Department because fees were paid and grants made, and I wanted a University degree. I had no desire to become a teacher. Other friends in the same form were adopting this course."

Nearly all the men who entered an Education Department on entering the university give the Board of Education grant as one of their motives for choosing the profession. Altogether these figures indicate one undesirable effect of a grant specifically for degree courses for teachers, though this, of course, is not the only aspect. Nor does it follow that the choosing of teaching *after* taking a degree ensures that it shall be based on sound motives. It is quite clear from our results that it does not, and that even then there may appear to be no alternative to teaching.

Another fact relevant to this problem is that though 33 per cent of the men only entered an Education Department after taking a degree only 18 per cent had not already decided to become teachers by the age of 19, the figures for women being 23 per cent and 7 per cent respectively.

Two other comments may be made as to the men's results. "Fondness for children" is no more weighty a motive than was the fact that there was no prospect of any other occupation; and finally, it shows something for the honesty of these reports that there is little pretence of being led into teaching by high ideals—ideals coming tenth in the list of motives.

Original Motives of Women Students.

Turning now to the women's list in Table I, we find that the main motives are (1) the desire to be in a profession associated with their favourite study, and (2) a feeling that they would like teaching. Then appreciably below these come (3) fondness for children, (4) the economic desirability, and (5) the Board of Education grant.

The prominence of the desire to continue in touch with some favourite study gives one some food for reflection. It is put first on the list of motives by nearly one-third of the women; it was overwhelmingly first with the women of the 1925-26 group (62 per cent compared with 36 per cent for the second motive), and a close second for the men of that group. We have seen that it was third in the list of the men, and as we shall see it is first in the present-day motives with both the men and the women. It is undoubtedly important that teachers should be enthusiastic about the subjects they are to teach, but one wonders how many of these students will be disappointed when they find, as they so often do, that the subject which appeals to them so strongly has to be taught to some children who are apathetic about it, and chiefly at elementary stages where in some cases the subject becomes a very different thing. In some cases indeed a student is unable to teach his favourite subject at all.

The following remarks by students illustrate the type of motive to which we are referring:

(*a*) " I liked Maths., and if this was taken up the only thing it seemed to me to do with it was to teach it."

(*b*) " I wished to go to college and take a degree in Maths., and teaching seemed to be the only profession for which this seemed to be a qualification."

(*c*) " Many have a feeling of frustration because they ground three years for a degree always with the intention of teaching but now they find there is hardly any possibility to teach the subject they really love."

This last predicament will, of course, occur with Science Graduates who have not done well enough to obtain posts in Secondary Schools and who must then accordingly spend most of their time teaching Elementary English, History, Geography, and Arithmetic; similarly students with low honours degrees in English, Classics, or Modern Languages may also have to take posts in primary schools where they have little or no opportunity of teaching the subjects they like best. Taken in conjunction with this desire to continue a favourite study, the influence of a Board of Education grant would be considerable with the women, as seen by our figures, though it does not take so high a place as with the men. Here again, however, we must bear in mind that nearly one-fifth of the women had no Board of Education grant during their degree courses. The scores of this motive, then, should be increased by one-fourth to make them proportional. This would put it fourth instead of fifth in the weighted score order.

It is pleasing to see how prominent " Fondness for Children " is among the motives of the women though it took a low place with the men. Many serious and valid criticisms have been made as to the value of Pupil Teacher work and of the Student Teacher Year.* The question arises here, however, as to whether it is possible for the student to discover at an early stage if he is likely to be fond of children in the mass. Some preliminary teaching might have some value in *guiding* the student to a wise decision, even if it had no value as *practice* in teaching.

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* See A. Pinsent: *Pre-College Teaching Experience and other Factors in the Teaching Success of University Students.*—This *Journal*, 1933, Vol. 3, pages 109 and 201. Also:
G. H. Turnbull: *The Influence of Previous Teaching Experience on Results obtained by Students in a University Department of Education.*—This *Journal*, 1934, Vol. 4, page 1.

An interesting point in the women's list is that so few of them stated that they felt that there was no alternative prospect. One often hears the statement made that girls who remain for the Higher Certificate course in the schools, and who are "intellectually inclined," are driven to teaching because there are so few suitable other occupations open to them; yet only 4 of the 153 women put this as their first motive, and only 33 women give it as a motive at all. This suggests either that this idea as to lack of alternative prospects for such girls is exaggerated, or at least that these girls did not feel that it applied in their own cases.

Before we leave this study of original motives, perhaps we should comment on the fact that the attraction of "Long Vacations" is as strong an influence as the "Parents' Wish" in the case of the men, and that with both men and women "Long Vacations" comes as a motive above "Influence of an admired teacher."

V.—MOTIVES AT THE TIME OF ENTERING THE PROFESSION.

Table III gives the result of the second part of the questionnaire, namely, the motives influencing students at the time of making their report, and only a few months before entering on the work of teaching. I shall refer to them as "present time motives."

TABLE III.

MOTIVES AT TIME OF ENTERING THE PROFESSION.

	MEN.	*Percentage Score.*	*Frequency with which put first.*	WOMEN.	*Percentage Score.*	*Frequen with whi put fir*
1	Interest in favourite study	49	30	Interest in favourite study	64	37
2	Liking for teaching	46	38	Fondness of children	56	23
3	Ideals	46	23	Liking for teaching	51	29
4	Feeling of special fitness ..	36	29	Ideals	51	24
5	Interest in education	35	16	Interest in education	43	9
6	Economic desirability	33	10	Economic desirability	36	8
7	Fondness for children	30	12	Feeling of special fitness ..	27	8
8	Long vacations	24	—	Long vacations	19	1
9	No alternative prospect ..	22	13	Inability to change	15	8
10	Inability to change	20	14	No alternative prospects ..	15	6
11	Enjoyment of power......	18	3	Enjoyment of power......	14	—
12	Social status	15	1	Social Status	12	2
13	Board of Education grant*	10	5	Board of Education grant .	10	—
14	Parent's influence	8	—	Parent's influence	10	—
15	Stop-gap	7	1	Stop gap	4	3
16	Influence of admired teacher	5	1	Influence of admired teacher	3	—
17	Persuasion by teacher ..	1	1	Persuasion by teacher ..	2	1
			†197			†159

* Probably as a "present-time motive" this must be interpreted as meaning that the student feels that, having taken the grant, it is his duty to teach, though otherwise he might not wish to.

† Totals are slightly greater than total number of men and women because two men and six women bracketed two motives first, both of which are included in Table III.

Several things are worthy of note in Table III. Interest in the favourite studies has now become the most attractive feature of the teaching profession among the men and it remains first in the list of motives for the women. The Board of Education grant would obviously disappear from this list, except where it may be mentioned as implying an obligation to continue in the teaching profession in view of the fact that the grant has been given definitely for the purpose of preparing the student for teaching. It is good to find that the first five motives among the men and among the women are not unworthy ones. It is true that this is simply on the report of students themselves, but in view of their anonymity there is no motive for putting forward praiseworthy motives. They are still frank, for example, in putting the attraction of long vacations fairly high, and their frankness was also indicated in Table I in putting economic desirability so high and ideals relatively low. Even granting that some of these students may be somewhat self-deceived in thinking that ideals have now such a strong motive force it is something at least that they should mention ideals and put them so high. That could not be done by persons who were not at least conscious of ideals of service in entering the teaching profession. It is gratifying, too, to find the general liking for teaching mentioned as a substantial motive by so many about half-way or more through the year of training when they have had some opportunity of judging as to what their attitude to teaching may be. It is pleasing also that a broader interest in education, such as one would hope would be one effect of professional studies in the post-graduate year, is mentioned frequently and given fair weight.

On the other hand, it cannot be ignored that the replies of a substantial minority of the students are hardly satisfactory. It will be noticed that in the questionnaire, in the second part of the enquiry, the heading "Inability to Change," was added especially for this second part; but a number of students marked the other motive-title "No alternative prospect." To take up teaching merely as a "stop gap" is equally undesirable. It is regrettable to find that one or other of these three reasons is actually put *first*, as the chief reason, by 28 men and 17 women; and they appear as the second motive with a further 22 men and 9 women.

It is almost inevitable, of course, that most students, after taking a degree and going through a course of training for teaching, should then feel that there is no alternative to teaching; and this is indicated as *one* reason for continuing by 90 men and 60 women (not counting overlapping, when both headings were marked). But it is more serious to find that 36 students (23 men and 13 women) definitely regard their teaching merely as a stop-gap till something better is found.

It may be of interest now to attempt some estimate, if only a very rough one, as to what proportion of these students are now entering the teaching profession moved by satisfactory motives, assuming that they reach a satisfactory standard of teaching in their training year. Suppose we take it that so far as motives are concerned it is satisfactory when any of the following are put as the first and main influence :

Liking for teaching ;	Interest in Education ;
Ideals ;	Fondness for children ;
Feeling of fitness for teaching ;	Influence of admired teacher.

I suggest as undesirable motives the remainder with the exception of "Interest in favourite studies," which is rather ambiguous ; this latter may be extremely useful or it may, as we have seen, be somewhat misleading.

I have accordingly examined the second motive of these students who put "Interest in favourite subject" as the first motive, and classified them according to this second motive as satisfactory or not. If we accept then this general classification of first motives we find 132 men and 112 women entering with a worthy motive as the main influence ; that means that with about one-third of the men and over one-fourth of the women some undesirable motive is the main one, and among these students the absence of any alternative prospect is by far the most frequent reason for their choice.

If we regard "economic desirability" as neutral, we are still left with over one-fourth of the men and nearly one-fourth of the women entering with an undesirable main motive. (I have included the very few men who refer to the Board of Education grant still being a main motive. This in a sense is a worthy motive as they are following a sense of duty, but it is undesirable that a man who enters the teaching profession should do so chiefly for this reason.)

It is of interest to note that the economic desirability is as high up in the list of motives for the men as with the women.

That it is the security of the teaching profession which makes special appeal to the men at this time of grave uncertainty in other forms of occupation is suggested by some figures under "Reasons against the choice of the Teaching Profession," to which we now proceed.

VI.—REASONS AGAINST THE CHOICE OF THE TEACHING PROFESSION.

Table IV gives the reasons against the choice of the teaching profession among students in the three Universities of Sheffield, Leeds, and Newcastle before whom the list of suggested reasons was placed. In

Birmingham only spontaneous reasons were given and these were used in drawing up the list submitted to the other Universities. The Birmingham results will be referred to briefly.

TABLE IV.

REASONS AGAINST THE TEACHING PROFESSION.

Three Universities combined (Sheffield, Leeds, and Newcastle).

COMPARISON OF MEN AND WOMEN.

		MEN.		WOMEN.		
	Number of students	139		110		
Motive.		*Percentage Score.*	*Rank.*	*Motive.*	*Percentage Score.*	*Rank.*
I.	Salaries unsatisfactory	67	1	V.	68	1
II.	Long and expensive training	60	2	VI.	55	2
III.	Small prospects of promotion	45	3	VII.	53	3
IV.	Deficiency of education authorities	40	4	II.	51	4
V.	Get into a rut	37	5½	IV.	34	5
VI.	Examination fetish	37	5½	I.	25	6½
VII.	Hard work and mental strain	36	7	X.	25	6½
VIII.	Low standing with public	32	8	III.	24	8
IX.	Erratic " Heads "	27	9	XI.	23	10
X.	Monotony	21	10	XII.	23	10
XI.	No scope for self-development	20	11	IX.	23	10
XII.	Isolation from adults	12	12	VIII.	14	12
XIII.	Small chances of marriage	9	13	XIV.	11	13½
XIV.	Bickering amongst school staff	4	14	XIII.	11	13½
XV.	Women dismissed on marriage	1	15	XV.	4	15

Considering Table IV, we notice that the lowness of the salaries is mentioned far more frequently by the men than it is by the women. One woman generously remarks " Salaries are unsatisfactory for men but not for women." It comes first also in the spontaneous list of the Birmingham men students. This fact indicates that the economic desirability mentioned (as a prominent motive with the men) in the earlier tables refers rather to security than to salaries. The very high position in the table of " Long and expensive training " and " Small prospects of promotion " all show that this aspect is the most prominent with the men whereas with the women, though they also stress the " long and expensive training," the strongest objections rather refer to the more *personal effects* of choosing the profession, for example the danger of getting into a rut and becoming dogmatic, the restriction of the freedom of teaching by the examinations, and the mental strain involved in teaching. (Here again in the Birmingham women's spontaneous list the " danger of getting into a rut " and the excessive strain are the first and second motives.) We notice that for these young women at this stage of their career the idea of dismissal on marriage has no terrors, appearing right at the bottom of the list. Two observations made by women under these objections to teaching may be quoted : " When I saw how prim and proper most teachers become at the age of forty my resolutions were weakened." Another refers to the " inability of women to exist together in staffrooms without petty quarrels."

The general order of the " reasons against " suggests that the main way in which the profession could be made more attractive to men, if they are choosing it after graduation, would be an increase in salaries and better prospects of rapid promotion ; whereas with women it would be made more attractive rather by the widening and enriching of the life of the school teacher, the reduction of hours of work or size of classes, and the pressure of examinations on the teaching. (It should be remembered that though in some girls' Secondary Schools the hours of actual teaching tend to be somewhat less than in corresponding boys' schools, there may be more written work to correct; further, about half the women in this enquiry would have elementary school work in view. The life of the unmarried woman teacher is also apt to become narrower and more centred in the school than that of the men who marry, who constitute the majority.

The fact that both men and women put the long and expensive training as a strong objection provides food for thought for those who would lengthen the degree course to four years for all students, and for those who think the course for professional studies ought to be two years instead of one.

In conclusion, I would again stress the fact that we are only dealing with the motives and ideas of young people when choosing or entering the profession. It does not follow, for example, that among teachers of several years' experience, the same differences would appear between men and women in their criticisms of teaching as a profession; nor is the present paper the appropriate place to discuss problems of policy, either in reference to the Board of Education grant for the degree courses, or the comparative salaries of men and women, or any other topics. It has merely been my object to present some facts which are least relevant to these very complex and difficult problems.

VII.—SUMMARY OF RESULTS AND CONCLUSIONS.

The anonymous reports of about 400 graduates in four universities indicate :

(1) That there is no truth in the view that the advice of Secondary School Heads is the chief influence in deciding pupils to choose the teaching profession. This is further supported by an examination of the reports of pupils just leaving the Secondary School.

(2) Among men, taken all together, economic desirability is the motive of greatest weight at the time of choosing the profession ; but among those who entered an education department at the time of entering a university the main motive force is the influence of the Board of Education grant. With a good number of men and women the chief reason for choosing the teaching profession is in order that they may get the Board of Education grant and so be able to afford a university education.

(3) The influence of the parents is not very great, but in a small number of cases the decision seems to have been largely the result of parental influence.

(4) With both men and women, especially the latter, one of the most powerful original motives is a desire to be in a profession in which they will keep in touch with favourite studies. By the time of entering this has become the most powerful motive. As such a large number of students who have specialized at the university have to teach in elementary schools, it is pointed out that many of such students are likely to be disappointed.

(5) A substantial minority of men state that they had "no alternative prospect" when they chose teaching. This occurs less frequently with women. Nearly one-tenth of the students regard teaching as a "stop-gap."

(6) Among the women, general liking for teaching and fondness for children appear to be stronger motives than the economic desirability of the profession.

(7) As to motives actuating students just before the time of entering on their work as teachers, the deplorable fact emerged that forty-five students put, as the chief reason why they were entering the profession, the absence of any possible alternative, or stated that they were taking it up merely as a "stop-gap." The most influential motives among the majority, however, were of a satisfactory type, showing that a liking for teaching and an interest in education had developed before the end of their year of training.

(8) In reports on reasons against the teaching profession, the men stress the lowness of salaries, the long and expensive training, and the small prospects of promotion. The women's main objections are of a more intimate type—the chief one being the fear of getting into a rut, the next the domination of teaching by examinations, and the great mental strain involved in teaching.

My thanks are due to my colleague Mrs. F. M. Austin for reading my proofs, and for a number of most helpful comments and suggestions.

RÉSUMÉ.

UNE ENQUÊTE SUR LES RAISONS DU CHOIX DE L'ENSEIGNEMENT COMME CARRIÈRE, AVANCÉES PAR DES ÉTUDIANTS D'UNIVERSITÉ.

On fit une enquête parmi plus de 400 diplômés, venant de quatre universités différentes (a) quant à leurs raisons originales pour le choix de l'enseignement et (b) quant aux motifs qui les animaient au moment même d'entrer dans la carrière.

On découvrit que la supposition, avancée quelquefois, que la persuasion exercée par le directeur de l'Ecole Secondaire soit une influence importante, est fausse. Une proportion élevée des étudiants (les hommes surtout) choisirent d'abord l'enseignement, principalement parce qu'ils pouvaient ainsi se procurer, au moyen de la subvention spéciale du Ministère de l'Education, une éducation universitaire.

Les attraits économiques de cette carrière (y compris la sécurité) faisaient, au commencement, un appel plus grand aux hommes qu'aux femmes, qui étaient influencées surtout par un désir de continuer leurs études dans les branches préférées, par l'amour des enfants et de l'enseignement en général.

Quant aux motifs qui animaient les étudiants peu de temps avant de commencer leur tâche de professeurs le fait déplorable se présente, que plus de quarante étudiants avancèrent comme raison principale pour entrer, dans l'enseignement le manque de toute alternative possible. Chez la plupart des étudiants, cependant, les motifs actuels étaient d'un type satisfaisant, montrant que l'amour de l'enseignement et l'intérêt dans l'éducation s'étaient développés pendant l'année de préparation professionnelle.

Dans des rapports sur les désavantages de l'enseignement les hommes appuient sur le niveau bas des traitements, et la perspective insignifiante de la promotion. Les objections principales chez les femmes sont d'une nature plus intime. La plus importante est la crainte de prendre un pli, ensuite la domination exercée sur l'enseignement par les examens, et enfin l'effort mental excessif exigé par l'enseignement.

ZUSAMMENFASSUNG.

EINE NACHFRAGE NACH DEN GRÜNDEN FÜR DIE WAHL DES LEHRBERUFES VON UNIVERSITÄTEN.

Man hielt eine Nachfrage unter über 400 Graduierten an vier Universitäten betreff (a) ihrer ursprünglichen Gründe für die Wahl der Lehrerlaufbahn, und (b) der Veranlassungen, die sie jetzt am meisten beeinflüssen, wenn sie eben in den Lehrerstand treten wollen. Die von den Studenten gegebenen Antworten waren anonym.

Es wurde entdeckt, dass die häufige Annahme, der Rat des Direktors der höheren Schule (engl.) spiele eine grosse Rolle in der Wahl des Lehrberufs, nicht stichhaltig ist. Eine grosse Anzahl der Studierenden (besonders der männlichen) hätten den Lehrberuf ursprünglich grösstenteils gewählt, weil sie auf diese Weise zum Universitätsstudium mittels des vom engl. Unterrichtsministerium bewilligten Geldes haben gelangen können.

Die wirtschaftlichen Vorzüge des Berufs (unter ihnen eine sichere Existenz) übte ursprünglich einen grösseren Einfluss auf männliche als auf weibliche Studierende aus, die sich hauptsächlich durch den Wunsch beeinflusst fühlten, sich in ihren Lieblingsfächern weiterzubilden, und überhaupt durch Liebe zu Kindern und zum Lehren.

Was die Veranlassungen der angehenden Lehrer anbelangt, kam die beklagenswerte Tatsache heraus, dass über vierzig Studenten behaupteten, sie wollten eine Lehrerlaufbahn betreten, hauptsächlich aus Mangel an möglichen Alternativen. Für die Mehrheit aber waren die Beweggründe befriedigender Art, was zeigt, dass Liebe zum Lehren und Interesse für Erziehung sich vor dem Ende des Probejahres entwickelt hatte.

Wenn die männlichen Studierenden sich über die Nachteile des Lehrberufs äussern, betonen sie die niedrigen Gehälter, die Dauer und die Unkosten der Beruflichen Ausbildung und die wenigen Aussichten auf Beförderung. Die Einwendungen der Studentinnen sind intimerer Art, vor allem Angst vor dem alten Geleise, dann die tyrannisierende Rolle der Prüfungen im Unterricht und die grossen Anstrengungen des Lehrens.

THE PRACTICAL VALUE OF THE JUNE DOWNEY WILL-TEMPERAMENT TESTS.

By FLORA KENNEDY.

(From the Department of Psychology, University of Glasgow.)

I.—*Purpose of the Investigation and Comparison with earlier enquiries.*
II.—*Administration of the tests.*
III.—*Statistical Results.*
IV.—*Inference from the results.*
V.—*Summary.*

I.—PURPOSE OF THE INVESTIGATION AND COMPARISON WITH EARLIER ENQUIRIES.

THE investigation to be described below was undertaken with the aim of ascertaining if its results would support previous findings. Among the " previous findings " considered are the results obtained in a somewhat similar investigation conducted by June Downey herself in collaboration with R. S. Uhrbrock (Reliability of the Group W-T Tests, *Journal of Educational Pyschology,* 18 : 592-600, 1927), where the coefficients of correlation range in value from ·85 to ·32. Two sets of circumstances may be noted for these results. The first of these is that in no instance was the time interval between the two applications of the text as great as a year, nor greater than a month; and the second is that the Reliability Coefficients then calculated rely in part on results obtained from adults.

With reference to the time interval, it has been stated (P. M. Symonds, *Diagnosing Personality and Conduct,* page 344) " that the facts show . . . that the correlations are higher when the interval between tests is a day than when it is a month." In the present investigation the only results considered are those obtained at an interval of twelve months. Because our results show still lower correlations, it would appear that time has a progressively devastating effect on the reliability of the test-scores.

In an article, published in the *British Journal of Psychology* (October, 1929), P. E. Vernon of Cambridge University declares : "Working with children, other investigators often seem to be more satisfied than I am " (with the W-T Tests). The present study, although the numbers are limited, brings the work with children decidedly within the field of the unsatisfactory.

The subjects tested in the present instance are children whose ages range from 11 to 13. Downey and Uhrbrock considered (Repetition one day apart) 149 normal college women ; 42 junior high school boys ; and 37 high school girls along with (Repetition one month apart) 136 boys. "The facts show," says Dr. Symonds (op. cit.) "that the average reliability is greater for adults than for junior high school pupils." The late Professor Decroly remarked that, in his opinion, the Will-Temperament Tests, so largely depending on handwriting, cannot be regarded as of anything like equal value in the case of children and in that of literate adults, as the manipulative difficulties encountered by the former are sometimes considerable and vary with age and experience.

H. O. Rugg (The Will-Temperament Test, *Journal of Applied Psychology*, 1923, Vol. VII, 65-76) comes to the conclusion that "Volitional Perseveration probably depends on habitual slowness and lack of intelligence." Dr. Mary Collins ("Character and Temperament Traits," *B.J.P.*, 1925, Vol. XVI, pages 89-99) is in agreement with this finding. The Volitional Perseveration scores of the present investigation were correlated with the I.Q.'s obtained by the Otis Scale given about six months previous to the administration of the June Downey Tests. The coefficient of correlation will be seen to be −·11, which, though not a significant figure, certainly bears out the statements made by the earlier investigators.

Certain Tests were selected for inter-correlation. A study of the statistical results will show that the coefficients of correlation for Self-confidence and "Non-compliance" are both insignificant and negative. The remaining correlations are confined to the group of tests given by June Downey as indicating "Persistence of Reaction." Here, too, coefficients are low but, with the exception of "Volitional Perseveration" correlated with "Non-compliance," all are positive. Thus, they are a further evidence that the "inter-correlation of tests are very near zero" (P. M. Symonds, op. cit, page 351).

II.—ADMINISTRATION OF THE TESTS.

The June Downey Will-Temperament Group Tests were administered to 86 first year pupils (ranging in age from 11 to 13) in the November following upon their entrance to a secondary school for girls. The tests were scored and a record of the results (1, Test-items ; 2, Total scores) kept. Exactly a year later, the same tests were given to the same pupils ; but alterations brought about by class-grading processes and the fact that several of the initial subjects had by this time left the school, resulted in a difference in the number: only 59 of the original group took also the second application of the tests, which were scored and the results recorded as a year previously. In addition, their I.Q.'s, ascertained some months earlier by the Otis Standardised Scale, were considered.

III.—Statistical results.

Number of subjects		59
Interval of time between applications		12 months
Correlations: Total scores—1st and 2nd Results		·12 P.E. ± ·10
Volitional Perseveration: I.Q.'s		− ·11 „ ·09
Correlation of the First Application of the Test-Item with the Second Application.		
Self-confidence		·11 P.E. ± ·09
Volitional Perseveration		·07 „ ·06
Interest in detail		·10 „ ·08
Non-compliance		·14 „ ·12
Motor-inhibition		·16 „ ·13
Co-ordination of impulses		·04 „ ·03
Intercorrelation of Some Test Items.	*1st Results.*	*2nd Results.*
Self-confidence: Non-compliance	− ·14 P.E. ·12	− ·12 P.E. ± ·10
Volitional Perseveration: Non-compliance	− ·21 „ ·18	− ·28 „ ·24
Volitional Perseveration: Motor-inhibition	·14 „ ·12	·17 „ ·14
Volitional Perseveration: Co-ordination of impulses	·26 „ ·22	·19 „ ·16
Motor-inhibition: Interest in Detail	·20 „ ·17	·10 „ ·08

IV.—Inferences from the results.

The present investigation appears to support, in general, the less favourable conclusions drawn from previous investigations of the value of the June Downey Will-Temperament Tests. However, there is some evidence (to be published later) that the low test-retest correlations are due not only to the unreliability of the tests themselves, but also to a genuine change in the function measured.

V.—Summary.

The June Downey Will-Temperament Tests were given to 59 high school girls of 11 to 13 years of age: for the first time, in the November of 1931 and for the second time, in November, 1932. The correlation coefficient of the results of the first application with those of the second was found to be ·12, and the correlation coefficients of a selection of individual test-item results (First application: Second application) range

from ·04 to ·16. Thus, it will be seen that the results testify to the insignificance of the coefficient of correlation between two applications of the tests to the same subjects and would thus appear to add one more proof of the unreliability of the tests.

RÉSUMÉ.

LA VALEUR PRATIQUE DES JUNE DOWNEY TESTS DE VOLONTÉ-TEMPÉRAMENT.

On appliqua ces tests à 59 jeunes filles, élèves de lycée, âgées de 11 à 13 ans : une première fois en novembre, 1931, et une seconde fois en novembre, 1932. Le coefficient de corrélation entre les résultats de la première application et ceux de la seconde fut ·12, et les coefficients de corrélation d'un échantillon des résultats des sections individuelles des tests (première application : seconde application) variaient de ·04 à ·16. Ainsi l'on voit que les résultats témoignent de l'insignifiance du coefficient de corrélation entre les deux applications des tests aux mêmes sujets, et semblent offrir encore une preuve du manque de validité des tests.

ZUSAMMENFASSUNG.

DER PRAKTISCHE WERT DER "JUNE DOWNEY" WILLENS-TEMPERAMENTSTESTS.

Die June Downey Willens-Temperamentstests wurden Mädchen von 11 bis 13 an höheren Schulen gegeben, und zwar zum erstenmal im November 1931 und zum zweitenmal im November 1932. Der Korrelationskoeffizient der Resultate der ersten Anwendung mit denen der zweiten hat sich als ,12 herausgestellt, und die Korrelationskoeffizienten einer Auswahl von Ergebnissen individueller Testeinzelheiten (1. Anwendung : 2. Anwendung) erstrecken sich von ,04 auf ,16. Daher begreift man, dass die Resultate auf die Bedeutungslosigkeit des Korrelationskoeffizienten zwischen zwei Anwendungen der Tests an dieselben Vp. hinweisen. Auch scheinen sie einen weiteren Beweis von der Unzuverlässigkeit der Tests zu liefern.

THE VOCABULARY BURDEN IN THE FIRST YEAR OF FRENCH.

By WINIFRED F. ROBSON
(*Education Department, Leeds University*).

I.—*The need for knowledge of the vocabulary burden in French that a child can carry in the First Year of French.*
II.—*The inadequacy of existing methods of gauging extent of vocabulary.*
III.—*The investigation undertaken.*
IV.—*The results obtained* :
  (1) *Relationship between the time given, the number of words presented, and the number of words learnt.*
  (2) *Relationship between the number presented and the general intelligence of the class.*
  (3) *Relationship between the average I.Q. and the result obtained.*
  (4) *Analysis of individual results in the vocabulary and intelligence tests.*
  (5) *Comparison of the results with the subsequent achievement in the subject.*
  (6) *The effect of method.*
V.—*General conclusions.*

I.—THE NEED FOR KNOWLEDGE OF THE VOCABULARY BURDEN IN FRENCH THAT A CHILD CAN CARRY IN THE FIRST YEAR OF FRENCH.

THERE is still considerable uncertainty among teachers as to the size and nature of the vocabulary in a foreign language which children may reasonably be expected to acquire in the first year under the varying conditions and methods that exist in this country. Young teachers in training frequently ask what achievement in vocabulary is considered a satisfactory result for a year's work ; what number of words they should present and the basis upon which the words should be selected ? It is impossible to give them any satisfactory answer, as although the opinion of experienced teachers is readily available there is considerable difficulty in pointing to any known objective facts.

Text books seem to be a very poor guide in this respect. The variability of first year courses is remarkable. A recent investigation undertaken by Dr. Benn and Mr. Milton* into the first year courses common use in English schools brought out clearly that in most es there is no indication as to the number of words presented and no son given as to why the author considers the text adequate for one r's work.

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* H. MILTON, T. V. BENN, and COLLABORATORS : *Study of the Vocabulary of Thirty First Year French Courses.—Modern Languages*, Vol. XIV, Nos. 1, 2, and 5.

Many teachers find in practice that they cannot get through first r courses in one year and wonder if the explanation lies in the text ok itself, the intelligence of their pupils, or the adoption of faulty thods of teaching.

In a few cases, however, authors do state the actual content of ir texts but this does not help much, as there seems to be no clear eement between them to give a lead to the teacher. For example, ppi* bases his "Beginner's Course" on a vocabulary of 300 nouns, 0 verbal forms, 100 adjectives and adverbs, making a total of 560 words, cluding idioms. He aims at producing a simple text, by which he ans one which the children will find easy. He does not indicate, wever, by what criterion he considers a word easy or difficult, stating nply that it is a mistake to think short words easier than long ones, any rate in French. His selection both as regards number and nature based on his own personal experience and preferences. Miss Baker† nsiders that "it is probable that a beginning student does not learn ore than 400 words, that is in addition to the words which are identical similar to the English." Grundy,‡ on the other hand, builds his Modern Method French Book, Part I," on a vocabulary of 720 common ench words, selected on a basis of frequency and states that he conders this sufficient material for one year's work.

Most French courses contain many more new words than these d are built up generally according to the individual author's views to what constitutes a useful vocabulary. Since Grundy's work, wever, texts based on frequency lists are beginning to appear, and ese should greatly facilitate the task of both pupil and teacher, without any way necessarily limiting either of them. Still as yet the problem the actual vocabulary burden a child may reasonably be expected to rry has not been considered.

An examination of texts for teaching children their Mother Tongue veals a similar uncertainty as regards the number of words a child ould be able to recognise after a definite period of study. An analysis of a number of first half-year readers showed that the vocabulary content ranged from 630 words through 579, 546, 436, 427, 396, 383, 377, 308, 209, to 157.* This remarkable variety shows the need for arriving at some definite conclusion as to children's ability to recognise words in their own language. It is still more important to do so when it is a case of tackling a foreign idiom, by which time the child already has one set of linguistic habits, likely to interfere with the acquisition of the new knowledge. The proper adjustment and size of the vocabulary must be factors of importance in determining the child's progress. A child whose hearing and vision are normal may make no progress in reading his own language until the material given him is controlled.

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* MARC CEPPI: *French Lessons on the Direct Method. Junior Course* (Hachette), 923 Preface, page viii. Beginners' Course, Preface, page vii.

† FLORENCE F. BAKER.—*Journal of Educational Research*, Vol. XVIII, page 0.

‡ J. B. C. GRUNDY: *Longmans' Modern Method French Book I*, Preface.

Not only does attention to the selection and arrangement of words determine the ease with which the child learns to read his own language but it also materially affects his attitude towards the work. It is true that the circumstances in learning a foreign language are not parallel, but this conclusion does suggest that if the vocabulary burden plays an important rôle in the teaching of the Mother Tongue, which is part and parcel of the pupil's everyday environment, it must also be a factor in determining his power to understand a foreign text and therefore affect, to some extent, his attitude towards the acquisition of the language. The work of West† in India would also seem to bear this out. By the careful choice of content and arrangement of his English readers for Indian boys he found that they were able to progress at a greatly increased rate.

Experienced teachers will agree that the question of attitude towards the subject is often fixed in the first year and that it is more fundamental in determining the progress of the children than the detailed working out of methods. We do, therefore, need to know what is a reasonable vocabulary burden for the child to carry. How may this be discovered?

II.—THE INADEQUACY OF EXISTING METHODS OF GAUGING EXTENT OF VOCABULARY.

It is obviously useless to attempt to discover the child's actual achievement in one year by means of an ordinary vocabulary test.

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* GATES, A. I.: *Interest and Ability in Reading.*—(Macmillan, 1930, page 5), quoted from the *Elementary School Journal*, Vol. XXII, June, 1922, pp. 745-749.

† MICHAEL WEST: *The "New Method" System of Teaching the Reading of Foreign Languages*, Vol. X, No. 1, page 8; and also in *Bilingualism.—Bureau of Education in India*, Occasional Reports, page 301.

This usually consists of either a list of selected words or a number of pieces of translation which aim at sampling a pupil's knowledge of different types of vocabulary. The " New Type Modern Language Tests " used in America also give no indication of the actual size of a child's vocabulary. The vocabulary section of the American Council " Beta " Tests compiled by Professor Wood consist of one hundred words to be correctly recognised by what is known as the " multiple choice technique," that is, the child has to select from a number of English words the one which correctly translates the given French word. The " Alpha " test, drawn up by Professor Henmon is similar in type.* It consists of seventy-five French words selected at random from successive frequency groups. In this way an attempt is made to select words by reference to an objective standard of measurement, the frequency lists. The words are arranged in an ascending scale of difficulty according to the frequency of their use. The whole test can be given in fifteen minutes. No doubt this kind of test is of great value in sampling a child's vocabulary but it is no sure indication of the size of the vocabulary since it is quite likely that the pupil might know few words and yet be able to score at different frequency levels. All the methods used so far seem to involve a selection of material on the part of the teacher or examiner for testing purposes. This introduces an element of luck which prevents such tests from having any real validity as regards the pupil's actual knowledge. The most they can do is to discover the gaps in the knowledge of some of the children without necessarily exposing the ignorance of others.

Again such tests often do not differentiate between the active and passive knowledge of the child. Thus, for example, he may know one word when he sees it but be quite unable to think of it without some visual or aural stimulus. If this particular word is chosen by the examiner for the test of ability to translate from French into English, the pupil will be able to score, but if by chance it should occur in the test from English into French, not only will he fail to score but may thus be unable to show his knowledge of the particular grammatical form it should take, although he might be able to do so if he heard the word. Thus a second element of luck is introduced.

The only safe method would seem to be to evolve some kind of test which would entirely eliminate the subjective element of choice by the individual compiling the test. This means that the pupil must be given the opportunity of showing all he knows both as regards the meaning of the words when he sees and hears them and also when the need arises to produce them without such help.

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* Publications of the American and Canadian Committees on Modern Languages. Volumes I, V, and VII. (Macmillan).

There are other factors of a variable nature which make it impossible to evolve a vocabulary test which could be given to all pupils at the conclusion of one year's work and yet be a fair test. The time devoted to the language is very important, for not only may it determine the number of words a child meets but also the number of repetitions a given word may receive before it is learnt. Other variables likely to affect results, such as the general intelligence of the children, environmental factors affecting attitude, the teaching methods used, cannot be ignored.

With these difficulties fully realised it was decided to attempt to measure the actual achievement in vocabulary of a number of children after one year of instruction. Thus all would start fair.

III.—THE INVESTIGATION UNDERTAKEN.

A general plan of procedure was evolved and the co-operation of a number of modern language teachers was sought. This was freely given. Unfortunately, external circumstances, illness, misunderstanding of instructions, interfered with the successful carrying out of the plan in some schools and reduced the number of classes from which reliable information could be obtained. The investigation was, however, completely carried out in sixteen different classes, numbering in all 356 children drawn from schools of the following types, situated in different parts of the country, in order to get as wide a sampling as possible: three elementary schools, one central school, two mixed secondary schools, one convent school, four girls' high schools, and one boys' grammar school; twelve schools altogether.

As the aim was to ascertain the actual number of words the children would know by the end of the first year of study, the teachers collaborating agreed to keep a record of all the words they presented in the course of the teaching, a somewhat formidable task in view of the already heavy work most of them have to undertake. In order to obtain uniformity of procedure by all, the following instructions were circulated and the teachers asked to make known any difficulty of interpretation they might experience.

(1) *The Compilation of the Lists.* (*Two lists to be made.*)

(*a*) The first should contain all the foreign words the children may have seen during the year's work. This list should include all inflexional forms of one word which really constitute new units of vocabulary, but not those which really test a knowledge of grammatical forms, i.e., aller, allez, allons, allais. Only one of these should appear in the testing list, whichever one the teacher knows the children have seen. Vont, va, vais, irai, font, viens, are really individual units of vocabulary, and, as such, should be scored as separate words. Regular inflexions of these would not be counted, e.g., fais, faisons, faisais, venez, irai, iras, irons, irez, iront, as these again constitute one unit of vocabulary. Similarly in dealing with nouns and adjectives, plural and feminine forms should not be included except when they constitute new units, e.g., bœuf, bestiaux ; cheval, jument. Cheval, chevaux would only count as one unit since the plural is a regular application of a grammatical rule.

The collaborators who use the vocabulary in the text book as a basis for the testing list will have to add irregular inflexions when these do not appear in such printed vocabularies.

(*b*) The second list should contain the English equivalents of all the foreign words seen and is therefore merely a translation of list (*a*).

(2) *Nature of the Tests.*

Two tests to be given, allowing a period of one week to elapse between the two, in order to prevent those whose retentiveness has a short span from securing a result higher than would normally be achieved.

The first test would be the writing down of the English of the foreign word given, list (*a*) being used for the purpose. This test should result in discovering the size of the pupil's passive vocabulary, i.e., those words whose meaning he can recognise.

The second test, using list (*b*), will give his active vocabulary, i.e., those words he is capable of using.

The tests will probably take up several lessons, the children being allowed to continue from the point at which the test had to be stopped. This is suggested in order not to disturb the organisation of the school and also to minimise the possibility of fatigue affecting the children's achievement.

(3) *Method of Giving the Test.*

The actual test to be given in one of three ways, whichever suits the conditions of the particular school.

(*a*) The children may be given cyclostyled lists of the words on which they write the meanings. This involves having copies for each child.

It is hoped that collaborators will adopt this method if at all possible, since it will prove the most satisfactory from the point of view of marking and the correlation of results.

(*b*) Writing the words on the blackboard, where there is a large one. In this case a complete list of the words given should be submitted with the results.

(*c*) Where the blackboard is small, dictating the word and writing it up. In this case also a complete list of the words given should be sent in with the children's papers.

Whichever method is adopted the words should be read aloud to the children so that they may have an aural as well as a visual perception of the word. Also the children should be told to work right through the list, i.e., if they do not recognise or know a word, not to sit thinking, but go on to the next.

All those collaborating adopted one or other of these methods, the most usual being the cyclostyled list.

Some variety, however, was shown in the compilation of the lists, as one would expect, but this was so slight as to be negligible, in view of the large number of words dealt with. For example, some teachers listed the personal pronoun object with the verb form and did not count it as a unit of vocabulary. This could only make a difference of eight marks to the total. In some cases, also, there was a slight discrepancy between the lists for recognition and production, due to words having more than one meaning. This led, on occasion, to only one meaning being given in the recognition list. To repeat the word would have confused the children and it was not foreseen that a comment such as "first meaning," "second meaning," etc., would have avoided this discrepancy.

Many of the collaborators, who wished to discover how their pupils had done, marked the work of their own classes. Others did not. In order to check the uniformity of the marking, sample scripts were taken and marked a second time. Although variations were found, they either cancelled one another out or were so slight as to be negligible.

In the marking of the recognition list which was to determine the size of the pupil's passive vocabulary, it was decided to pay no attention to English spelling. If the child spelled the word so that it was recognisable then he was given credit for knowing it. The test showed up the children's weakness in spelling their own language and also their ignorance of certain English forms, e.g., "fruiter" by analogy with "grocer," "baker," which words it happened to follow. Spellings such as "pottotoes," "cuboard," "crogdile," showed that the child had understood the French word and were not penalised.

In marking the active vocabulary, however, a different plan was followed. Only words which were perfectly known were counted. Spelling errors were marked separately in order to ascertain how far they affected the result. In deciding whether a word should be rejected or classed as a spelling error, the following standard was adopted. Only those words whose spelling might be thought to represent the sound were to be classed as spelling errors, similarly all omissions or errors in the use of accents. Thus in the following examples, taken from the children's work, no credit was given, but the words in the first group were distinguished from those in the second group by a special mark.

Word known but spelt wrongly :	*Word not known at all* :
petit dejéuné.	libriar for libraire.
saussice.	dentsle for dentiste.
juille.	pharmacer for pharmacien.
à aute vois.	autou for août.

Teachers were also asked to state the time given to the subject in the first year, the average age of the class, and the general method used in the teaching.

In addition a group test for general intelligence was given to all the children by means of "The West Riding Tests of Mental Ability, set Y." In this way the individual intelligence quotients of the pupils were obtained and the general intellectual level of the class discovered by taking an average. All the pupils concerned took the same test.

From this account it will be seen that every effort was made to carry out the investigation so as to obtain results which would have objective significance.

IV.—RESULTS OF THE TESTS.

(1) *Relationship between time, number of words presented, and number learnt.*

TABLE I.

Group.	*No. of pupils.*	*Average I.Q.*	*Average age.*		*Time. hours.*	*Number presented.*	*Words recognised.*		*Words reproduced.*		*Spelling errors.*
			Yrs.	*mths.*			*No.*	*Per cent.*	*No.*	*Per cent.*	*Per cent.*
A.	16	116	12	8	130	812	581	74	418	52	17
B.	6	119	11	3	126	499	361	72	251	51	15
C.	19	117	12	5	126	495	388	78	291	60	12
D.	23	114	12	0	121	1112	515	46	247	22	13
†E.	38	103	12	0	114	691	318	46	212	30	13
F.	30	119	10	9	114	650	415	64	354	54	9
G.	26	109	11	3	113	800	665	83	574	72	6
H.	30	117	12	8	110	480	331	69	244	51	10
I.	28	107	12	7	109	462	383	82	340	73	9
J.	25	115	11	9	109	449	374	83	330	73	8
*K.	13	116	13	5	104	450	298	66	323	72	2
L.	32	120	11	5	92	570	374	66	247	49	13
*M.	27	110	12	5	80	391	307	79	205	52	16
N.	12	130	11	6	74	458	259	52	195	44	8
*O.	22	113	12	0	40	260	132	50	107	41	3
*P.	9	118	11	8	25	212	189	89	149	70	16

* Elementary Schools. † Central Schools.

An alphabetical nomenclature has been adopted for the classes so that throughout the remainder of this paper the name of the group will serve as a reminder of its position in regard to the time spent on the subject.

Some very important facts emerge from an examination of the figures obtained.

The first thing one notices is the remarkable difference between schools in the amount of time given to the teaching of the subject. This ranges from 130 hours to 25 hours. If elementary schools are excluded the difference is still striking, i.e., 130 to 74 hours.

The second remarkable fact is the difference in the number of words presented by each teacher. One would expect this to be largely determined by the time available, but this only seems to be the case in those schools where very little time indeed is given to the subject. The range is from 1,112 words to 212 words. If classes receiving less than 80 hours of instruction are omitted, the range is from 1,112 to 391, and if one further omits those in which less than 100 hours are given to the subject then from 1,112 to 450 words were presented. Thus it happens that a child in one school may only have the chance of acquiring half or less than half the number of words presented in another. Evidently teachers vary very much in regard to the number of words they think it desirable to teach, apart altogether from the question of time. For instance, one teacher having 113 hours presents 800 words and another having more time, i.e., 126 hours, only presents 499 words, while a third having 121 hours presents 1,112 words. It hardly seems likely that a great emphasis on grammar could account for such considerable differences in the first year.

The children's performance in view of this variety is interesting. All the classes receiving 80 hours instruction or over succeed in attaining a passive command over 300 words. But the range of achievement is very great; some classes obtain a much better result than others. Thus the average attainment varies from a passive vocabulary of 665 words to 318 words, and an active vocabulary of from 574 words to 212 words. Averaging this out for these classes we get 417 words, the meaning of which is recognised, and 319 words which can be used actively.

The highest individual score for recognition knowledge is 789 words and in the test for active command 768 words, the intelligence quotients of these children being 133 and 110 respectively. The pupils who did best in the first test did not always do best in the second.

The lowest individual scores are 179 (test *a*) and 66 (test *b*), intelligence quotients being 84 and 82.

If classes receiving less than two hours instruction weekly are included, the average performance drops in test (*a*) to 368 words and in test (*b*) to 280 words, while the lowest individual scores are for (*a*) 69, and (*b*) 30, the intelligence quotients being 88 and 83. It will be seen that, as one might expect, the pupils with the lowest scores are of poor general capacity. The highest and the lowest scores obtained in each group are given below. These figures are for active vocabulary only.

Group.	*No. of pupils.*	*Highest score.*	*Lowest score.*	*Group.*	*No. of pupils.*	*Highest score.*	*Lowest score.*
A.	16	658	253	I.	28	411	245
B.	6	334	183	J.	25	424	229
C.	19	417	150	K.	13	392	219
D.	23	533	66	L.	32	404	110
E.	38	469	70	M.	27	292	66
F.	30	452	179	N.	12	384	38
G.	26	768	414	O.	22	200	30
H.	30	329	155	P.	9	180	120

It seems very difficult to arrive at a satisfactory conclusion as regards the relationship between the number of words presented and the number learnt. One would expect better results from the smaller vocabulary, owing to the greater number of repetitions per word it must make possible. However, this does not seem to be the case. If the classes with less than two hours instruction weekly are excluded, the best percentages were obtained where 812, 800, 495, 462, and 449 words were presented. Two conclusions are possible, either that the teaching in certain classes was exceptionally good and that the best range as regards number of words to present is between four and five hundred, or that any number below 800 has little effect on the percentage of words of which, at least, a passive knowledge is possible.

The results in the test for active knowledge are much lower, the best being obtained on vocabularies of 800, 462, and 449 words respectively. All the others were much below, the average attainment only reaching 51 per cent of the total number of words presented. The class that attempted more than 1,000 words made a low score. This vocabulary burden would therefore seem to be excessively heavy and uneconomical. However, until one has examined the relationship between general intelligence and the progress made in French vocabulary it would be unsafe to make any definite statement on this subject.

In one case the results for active vocabulary are superior to those in the recognition test. One can only account for this by the way in which the tests were given. In this school the lists were divided into fifteen sections of about thirty words each. Under such conditions it would be quite possible for a boy to carry in mind a word he did not recognise, so that he could look it up and achieve a better result in the second test. Where the lists were a little longer, this factor could not possibly play the same part. In every other case the recognition vocabulary was usually much larger than the active vocabulary. These results confirm the experiences of all language learners and are in accordance with the findings of American investigators.*

Some errors suggest either that the pupil's auditory perceptual powers are poor or that the teacher's articulation is indistinct, e.g., main translated as bread ; agneau translated as lamp.

Mistakes of association accounted for some errors, e.g., " la cane " translated as " the drake," i.e., associating the less usual French form with the less usual English form. Also such translations as " il neige," " it is raining," and " il pleut," " it is snowing," show confusion of association rather than inability to memorise.

Inaccuracies of spelling accounted for an average loss of 11 per cent. Some classes lost heavily and some very slightly. The size of the vocabulary presented and the time available for instruction has evidently nothing to do with weak spelling. Thus one school tackling 812 words loses 17 per cent on spelling, and another with a vocabulary of 800 only 6 per cent, although the latter had seventeen hours less time for the subject. No doubt physical conditions, such as the teacher's writing, the position and type of blackboard used, and the children's perceptual powers have a great influence on the ability to spell correctly. An examination of the actual work of the children shows that poor spelling often accompanies poor writing, and that some pupils have perceptual difficulties of a specific nature. The following examples, taken from the work of one pupil, show that only the beginning of words is really visually perceived by the child :

knife, coute.
thing, choici.
to marry, se mari.
bottle, bouteau.
sick, malarge.
work, travi.
catch, attaraper.
waiting room, salle da tante.

The same fault is not quite so noticeable in her English although examples of it do occur, e.g., hurridely.

Accents are a great stumbling block. Children do not realise their connection with sound and memorise the word vaguely as having an accent. Thus the acute, grave, and circumflex accents appear on various vowels indiscriminately. This suggests that many teachers do not link up the auditory perception of the word with its spelling. The attitude of the teacher generally towards the use of accents and the standard of spelling he exacts is probably much more important than the size of the vocabulary he presents and the time he has for dealing with it.

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* Professor B. Q. Morgan and Lydia M. Oberdeck : *Studies in Modern Language Teaching. Active and Passive Vocabulary.—Pub. of Amer. and Can. Com.*, Vol. XVII, Section 6. Macmillan, 1930.

The information obtained so far by the giving of these tests is, I think, important, for it indicates, in no uncertain manner, the variables which affect the results from the outset. At the end of one year the difference in possible achievement for the individual child with linguistic ability is enormous, and yet one would expect that the extent of the vocabulary studied would show less variation in the first year than in subsequent years when change of teacher and various removes make it difficult to keep track of vocabulary. The variability in regard to content seems hardly fair to the children if they all have to submit to the same external test four or five years later. There really does seem to be a case for some agreement on the part of teachers and examiners as to the size and nature of the vocabulary to be tackled. The American and Canadian Committees on Modern Languages told us in 1928 that the results of the administration of the " American Council Alpha Tests " in England to 6,000 pupils revealed " in a most startling light the variation in standards and achievements in English Schools."* It is disturbing to find this judgment so effectively corroborated by an investigation dealing with vocabulary alone and that only in the first year. One might console oneself, in the first case, by the thought that perhaps the " Alpha " tests were an imperfect vehicle for discovering what the pupils really knew, but it is impossible to do the same in regard to this test which measured the whole of the child's knowledge of vocabulary.

Teachers might think, however, that these variations are due to differences in the intellectual level of the various classes. One passes, naturally, therefore, to a comparison of the general intelligence of the class as a whole with the number of words the teacher presents. At the same time it is not safe to rely upon the average alone, as this might represent widely different conditions. For instance, one class might be fairly homogeneous, whereas another might contain some unusually good and some very dull children. In each case the average might be the same. For this reason it is essential to know the intelligence quotient of the lower half of each class, i.e., those who fall below the class average.

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* *Modern Language Instruction in Canada, Part II*, page 713.—University of Toronto Press. 1928.

(2) *Relationship between the number of words presented and the general intelligence of the class.*

TABLE II.

Class.	*Number presented.*	*Average I.Q.*	*I.Q. of the Lower Half.*
D	1112	114	97
A	812	116	107
G	800	109	95
E	691	103	95
F	650	119	109
L	570	120	111
B	499	119	98
C	495	117	108
H	480	117	105
I	462	107	100
N	458	130	116
K	450	116	109
J	449	115	106
O	260	113	96
M	391	110	101
P	212	118	112

When one compares the figures for general intelligence with the number of words presented by the teachers, one notices the absence of any relation between them. Thus a class with an average intelligence quotient of 120 has 570 words to learn while another with an I.Q. of only 109 tackles 800. School N, which had a particularly high level of general intelligence, did attempt more words than a school having six hours more time, but the results obtained were much lower. Poor grading may account for this. Some of the children had very high I.Q.'s but there were one or two with very low ones. These may have set the pace for the teacher with a consequent lowering of interest for the majority of the class. This is rather borne out by the general careless and slipshod style of the children's work. Still, comparing all the classes the case of School G (where the lowest I.Q. was 77 and the highest 133 with an average of 105) would suggest that it is not the general intelligence of the class which decides what it is possible for a teacher to attempt as regards vocabulary. Even if one takes the average intelligence of the lower half of the classes, there is no indication that the drag these children might be expected to exert actually affects the number of words the teacher presents. Where the grading was good fairly high results were obtained. In one case this was not so but even then there is no evidence that the average intelligence of the class affected the size of the vocabulary the teacher was able to present.

Variation might, of course, be due to the teacher's own attitude and skill. For example, he might deliberately limit the number of words, thinking thereby to get better results, or he might, himself, be slow and ponderous in his method of teaching. It is a common belief that thoroughness is more important than liveliness.

One rather interesting fact that emerges as the result of giving the intelligence test is that all the classes taking French have an intelligence quotient above the average. In this the elementary schools compare very favourably with the secondary and central grades. No doubt the groups taking French in the elementary schools are specially selected children, but since their I.Q.'s are higher than those of the central and of some secondary schools it does suggest that there is as good material left in the elementary schools as finds its way into the others. Much of the alleged difficulty of teaching French in the central and elementary schools may only be due to the inadequate time given, together with the inferior specialist qualifications the teachers in charge usually possess. In this enquiry the results they manage to attain, in the meagre amount of time allowed, testify to their teaching skill. The teacher in charge of School O, however, had as good specialist qualifications as those in most of the secondary schools. This is likely to become more general if the present unfortunate unemployment among qualified people persists.

The next point one wishes to discover is whether the general intelligence of the class is related to the number of words acquired by the children on these vocabularies of such widely different size. Percentages have been chosen as the only possible means of comparison.

(3) *Relationship between the average I.Q. and the average percentage of words learnt.*

TABLE III.

Class.	No. of pupils.	Average I.Q.	Recognition per cent.	Active per cent.	Age.		Mental Age.	
					Yrs.	mths.	Yrs.	mths.
N.	12	130	52	44	11	6	14	11
L.	32	120	66	49	11	5	14	4
B.	6	119	72	51	11	3	13	4
F.	30	119	64	54	10	9	—	—
*P.	9	118	89	70	11	8	13	6
C.	19	117	78	60	12	5	14	5
H.	30	117	69	51	12	8	14	7
A.	16	116	74	52	12	8	14	5
*K.	13	116	71	67	13	5	15	9
J.	25	115	83	74	11	9	13	7
D.	23	114	46	22	12	0	13	2
*O.	22	113	50	41	12	0	12	4
*M.	27	110	79	52	12	5	13	5
G.	26	109	83	72	11	3	11	10
I.	28	107	82	73	12	8	13	7
†E.	38	103	46	30	12	0	12	2

* Elementary Schools. † Central School.

From these figures it would seem that the average intelligence of the class does not determine the results a teacher may obtain. Classes with an average I.Q. of 107 and 109 are as good and often better than those with I.Q.'s ranging from 110 to 130, but of course this might be due to the differences in skill of the various teachers. Also there does not seem to be any relation between general intelligence and the achievement of an active as distinct from a passive command of the vocabulary. However, the variability between classes as regards the hours of study given as well as the difference among teachers in respect of the size of vocabulary presented make it impossible to draw any definite conclusions.

It is interesting that three of the groups obtaining the best percentages in the tests were young classes and that the older group that did well approximates to two of these in mental age. Still the good performance of School G, which has a lower mental as well as chronological age and which tackled one of the largest vocabularies, does suggest that we are really testing either a special ability in the pupils or the skill of the individual teacher.

However, an examination of individual scores may reveal a correlation between general intelligence and the child's ability to acquire French words. For this purpose the results obtained by each pupil in a class of boys and girls taught by the same teacher were tabulated.

(4) *Analysis of individual results in the vocabulary and intelligence tests.*

TABLE IV.

Girls. I.Q.	*Test (a) Passive.*	*Test (b) Active.*	*Spelling errors per cent.*	*Boys. I.Q.*	*Test (a) Passive.*	*Test (b) Active.*	*Spelling errors per cent.*
134	382	206	25	152	529	404	8
133	470	333	14	135	457	336	19
130	475	392	10	130	462	356	10
128	399	259	18	130	312	161	29
124	290	110	40	127	286	161	26
124	358	201	20	122	359	223	22
123	443	327	13	119	382	293	12
121	369	251	21	119	452	349	17
119	360	216	28	110	389	249	27
119	321	173	21	102	294	176	26
118	374	249	22	101	286	141	39
114	439	354	15	93	334	210	25
112	363	233	22	90	270	119	23
111	314	a	—	—	—	—	—
110	275	132	32	—	—	—	—
108	296	172	16	—	—	—	—
106	415	319	17	—	—	—	—

Total number of words presented=570.

In this class one finds a child with an I.Q. of 134 beaten by one with an I.Q. of 106. The children with I.Q.'s below 105, however, definitely do not score high marks. This may account for the low performance of the one school whose average I.Q. fell below this average although the exceptional size of this class may also be a factor determining progress. Taking all the children and using the method of ranks, a positive relationship between general intelligence and achievement in French vocabulary is shown. The probability of this relation being due to "pure chance" was worked out from Fisher's formula.* The following figures were obtained:

Coefficients of correlation between

I.Q. and Passive Vocabulary.	·6.	P less than 0·01.†
I.Q. and Active Vocabulary.	·4.	P between 0·05 and 0·02.
The two tests.	·9.	P less than 0·01.
I.Q. and Spelling of French.	·3.	P between 0·2 and 0·1.

All these results would, therefore, seem to be significant with the exception of that for spelling. In this particular class, however, the coefficient of correlation is not high enough to warrant the assumption that the possession of good general intelligence will lead to a high achievement in the subject. As one would expect the correlation between the two tests is very marked. The figures for spelling confirm the conclusion reached from the general analysis of the work in all the groups.

In case the correlations between the two tests and general intelligence should be due to conditions affecting one school only, coefficients of correlation were worked out for all the schools and the following figures obtained.

COEFFICIENTS OF CORRELATION BETWEEN GENERAL INTELLIGENCE AND THE RECOGNITION VOCABULARY.

Group.	*A.*	*B.*	*C.*	*D.*	*E.*	*F.*	*G.*	*H.*	*I.*	*J.*	*K.*	*L.*	*M.*	*N.*	*O.*	*P.*
No. of pupils..	16	6	17	21	36	30	23	28	25	24	13	30	24	12	22	9
r.	·7	·5	·6	·7	·3	·1	·4	0	·4	·6	·8	·6	·5	·3	·7	·2
P less than ..	·01	·3	·01	·01	·1	·6	·05	—	·01	·01	·01	·01	·02	·4	·01	·6
	S	—	S	S	—	—	S?	—	S	S	S	S	S	—	S	—

This table shows the correlation to be significant in the case of nine of the classes and possibly significant in one other class. Thus out of sixteen classes there is a definite relation shown in between nine or ten of them.

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* FISHER, R. A.: *Statistical Methods for Research Workers*, Vol. V. of *Biological Monographs and Manuals*. (Oliver and Boyd. Pages 151 and 172.)

† "P" is the probability of getting the "r" from "pure chance," and to be quite significant it is usual to require it to be less than 0·01.

COEFFICIENTS OF CORRELATION BETWEEN GENERAL INTELLIGENCE AND THE ACTIVE VOCABULARY.

Group.	*A.*	*B.*	*C.*	*D.*	*E.*	*F.*	*G.*	*H.*	*I.*	*J.*	*K.*	*L.*	*M.*	*N.*	*O.*	*P.*
No. of pupils..	16	6	17	21	36	30	23	28	25	24	13	30	19	12	22	9
r.	·8	·8	·5	·7	·3	·2	·1	0	·3	·5	·8	·4	·3	·5	·6	·1
P less than ..	·01	·05	·05	·01	·1	·3	·7	0	·2	·02	·01	·05	·3	·1	·01	·8
	S	S?	S?	S	—	—	—	—	—	S	S	S?	—	—	S	—

Here the relationship is only definitely significant in five of the classes and may be in three others. This means that in only half the number of classes tested is there a possible significant relationship between general intelligence and the ability to make use of French words.

COEFFICIENTS OF CORRELATION BETWEEN ACHIEVEMENT IN THE TWO TESTS OF FRENCH VOCABULARY.

Group.	*A.*	*B.*	*C.*	*D.*	*E.*	*F.*	*G.*	*H.*	*I.*	*J.*	*K.*	*L.*	*M.*	*N.*	*O.*	*P.*
No. of pupils..	16	6	16	21	38	30	23	28	25	24	13	30	24	12	22	9
r.	·8	·5	·9	·9	·8	·8	·8	·5	·8	·9	·8	·9	·9	·7	·9	·9
P less than ..	·01	·3	·01	·01	·01	·01	·01	·01	·01	·01	·01	·01	·01	·01	·01	·01
	S	—	S	S	S	S	S	S	S	S	S	S	S	S	S	S

In only one case out of the sixteen is the relationship not established and this is probably due to the smallness of the group.

By taking an average of the significant coefficients in each table we get the results:

(*a*) Intelligence and passive knowledge .... ·6
(*b*) Intelligence and active command .... ·6
(*c*) Passive knowledge and active command .... ·8

It is interesting to compare these results with the Li* correlations between the intelligence quotient and vocabulary as shown by the results of the administration of the American Council " Alpha " French

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* CHEN-NAN LI: *Factors Conditioning Achievement in Modern Languages.* Unpublished dissertation (Yale University, 1927). Quoted by Prof. V. A. C. Henmon in *Prognosis Tests in Foreign Languages,* Vol. XIV, of the Publications of the American and Canadian Committees on Modern Languages, page 7.

Tests to high school pupils. At the end of two semesters of instruction the relationship worked out at ·19 only, and at the end of three semesters at ·55. On the whole six semesters of the school course the correlation coefficients are low.

Other investigators have compared the performance in intelligence tests with general achievement in French and have not succeeded in establishing useful correlations. For example, Tharp* graded his French students arbitrarily into four grades on enrolment. They were also given the " Otis " Intelligence Test. At the end of one year their position was correlated with the grading by guess and with the I.Q. It was found that the latter " yielded a gain in accuracy of prediction above a pure guess of zero correlation in only 4·5 per cent of the cases.

Professor Bohan† also made a study of the relation of the marks obtained by University students taking beginning courses in English and French to their general intelligence and to one another. He found that the foreign language result correlated more closely with English than with General Intelligence, and that the English result correlated more closely with the intelligence test.

These results may be rather inconclusive because university students are usually a highly selected group to begin with, whereas the school children taking the vocabulary tests were drawn from schools of different grades and only selected in the sense that they were attending schools in which French was taught. Another factor which may have influenced the American results is the selective nature of their tests. It has to be kept in mind that the vocabulary tests in this investigation measured the whole of the pupil's knowledge, and necessitated the keeping of a very careful record of all the words a child met in the course of the first year's study, and then giving him the opportunity of showing his knowledge of them.

Further corroboration of the relationship which exists between general intelligence and the power to acquire French vocabulary may be found by an analysis of the average performance in each test of the three or four children in each group having the highest and the lowest intelligence quotients. Percentages were taken as the only possible basis of comparison.

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* JAMES BURTON THARP: *Sectioning in Romance Classes in the University of Illinois*; a study published by the American and Canadian Committees on Modern Languages in Vol. XVII of their publications, pages 364-432.

† JOHN E. BOHAN: *Prognosis Tests in the Modern Languages*, pages 35-55.—American and Canadian Committees' publications, Vol. XIV.

Group.	*No. of pupils.*	*Recognition Test.*		*Active Test.*	
		High I.Q.	*Low I.Q.*	*High I.Q.*	*Low I.Q.*
A.	6	81	67	61	39
B.	6	74	71	62	47
C.	7	88	70	77	43
D.	6	58	25	32	8
E.	7	58	30	47	22
F.	6	69	70	56	49
G.	6	93	71	77	68
H.	6	70	77	52	56
I.	6	90	75	82	66
J.	6	92	82	87	70
K.	6	82	56	88	64
L.	6	80	52	62	31
M.	6	85	75	65	49
N.	6	60	38	49	24
O.	6	63	36	55	20
P.	6	92	90	75	72

The difference is clearly marked in favour of the child with high intelligence except in the case of one school. Here the low quotients were just below the 100 level and the high quotients all above 136. This suggests that these very clever boys were either lazy or had little interest in French. Generally the clever child makes the higher score.

Occasionally a pupil with a low intelligence quotient makes a high score. This was so noticeable in one case that the teacher was consulted and remarked that this particular child was very bright in oral lessons but generally disappointing in actual achievement in the class tests. It was then arranged to give her a Terman Intelligence Test in order to discover if the first test had failed to do her justice. This raised her I.Q. slightly but it was interesting to find that her best work was done in the word tests, the picture interpretation, and the clock test. This suggests that she possesses special verbal ability and may easily explain the high score she obtained in the French vocabulary test.

Another child of low intelligence achieved a high score. The fact that she did better in the second test than in the first suggests that she also has a good verbal memory and profited by the revision of words brought about by the giving of the first test.

It is difficult to account for the poor performance of a child with a high intelligence quotient since a linguistic deficiency would have shown in the intelligence test. Speculation suggests that such poor results may be due to conative factors rather than to inability.

The children of good general capacity tend also to lose less on spelling except in the one school where the spelling of all the pupils was good. The teacher in this school may make a special point of accuracy in spelling. Some clever pupils, however, do spell badly.

(5) *Comparison of Results with Subsequent Achievement.*

If it is true that there is a close connection between linguistic functions, then success in this vocabulary test should be indicative of the ultimate attainment of the children in the subject. A comparison of results with the percentage of marks obtained in a subsequent class examination would show how far the tests have any prognosis value and perhaps also to what extent general intelligence tells in the long run. With this end in view the children from eight different classes were followed up three years later. The percentage mark in the last general test was obtained for 130 pupils and the class order for 147. Unfortunately, however, owing to re-classification and the presence of children who had not taken the vocabulary tests correlations could not be worked out for all the groups. The coefficients which were obtained are so different that it will be best to consider each class separately.

Group I (25 *pupils*).—Position after three further years of instruction correlated with:

Active vocabulary test	·2.	P 0·3.
Passive vocabulary test	·3.	P between 0·2 and 0·1.
General intelligence	·0.	

According to Fisher's formula none of these figures are significant. It is difficult to account for this lack of correlation as the performance of these boys in the first year test was so good that differentiations between them were slight. One would, therefore, consider them a very good class. It is, of course, possible that they possess the ability to memorize words as having meaning and lack some other essential power which, with general intelligence, goes towards the constitution of what we usually call linguistic ability. Another factor accounting for the lack of correlation might be a variation in the skill of the teacher concerned or a change in his methods. It would seem, however, to be due more likely to the fact that the class is fairly homogeneous. The intelligence quotient of the lower half reaches 100, so that in one sense the boys might be considered a specially selected group. Examining the individual scores we find that the boys who secure the first eight places in the general examination all had very high scores indeed in the first year vocabulary tests, i.e., marks ranging from 71 to 95 per cent. But some boys have not lived up to the promise of the vocabulary tests, in which they had very high scores, and are found low on the list, a position that one cannot explain as due to lack of general intelligence. Thus one cannot know whether the poor result is due to some linguistic deficiency or to loss of interest, either in the subject or in achievement.

Group J (24 *pupils*).—Position after three further years of instruction correlated with:

Active vocabulary test	·6.	P less than 0·01.
Passive vocabulary test	·6.	P less than 0·01.
General intelligence	·3.	P between 0·2 and 0·1.

In this class there is a significant relationship between the performance in the vocabulary tests and subsequent achievement but not between this and general intelligence. This also was a clever class, the I.Q. of the lower half being 106. Again pupils with very high scores in the first year tend to do best in the subject three years later, but the black sheep also appears in the boy with remarkably high scores, good general intelligence and a mediocre result.

Group G (28 *pupils*).—Correlation between subsequent achievement and the first year tests:

Active Vocabulary	·5.	P between 0·02 and 0·01.
Passive vocabulary	·6.	P less than 0·01.
General intelligence	·3.	P about 0·05.

In this class the first year results would seem to be symptomatic of ultimate success in the subject. These children did very well in the tests on a large vocabulary. They are not a clever set but the results suggest that they are hard workers and are well taught. The interesting fact that emerges from an examination of individual scores is the low position of the girl of very poor general capacity who did so well in the vocabulary test. She now only achieves 30 per cent of marks in the subject and is at the bottom of the class. With the exception of this girl, who it may be remembered was thought to possess an extraordinarily good verbal memory because of her better performance in the active than in the passive vocabulary test, all the others with high scores secure over 50 per cent in the work later.

Groups A and D were two classes in the same school taught by different teachers. They have since been re-classified into an upper and a lower division. In these groups children from each of the original classes are to be found. The first year Group D was the class that had to tackle the unusually large vocabulary.

Coefficients of correlation for the upper form (twenty-one pupils):

Fourth year result and the active vocabulary test	·3.	P about 0·2.
Fourth year result and the passive vocabulary test	·4.	P between 0·1 and 0·05.
Fourth year result and the general intelligence test............	·5.	P about 0·02.

In this class, only the correlation between general intelligence and the position after four years would seem to be significant. This is probably due to the regrading which produced the class. The lack of any significant prognostic value in the vocabulary tests is probably due to the differentiation between pupils in the size of vocabulary they had to tackle in the first year, a variation of from 812 to 1,112 words. Those who take the top places at the end of the fourth year all did well in the first year, whether they had to deal with the excessive number of words or not. On the other hand, some of those who did not succeed with the large first year vocabulary achieved a very fair result later. The pupil at the bottom of the list has a low I.Q. and did very badly in the first year tests. With an I.Q. of 87 she gains 21 per cent of marks only after four years' work. In the first year tests she achieved 29 per cent of marks for passive vocabulary and only 11 per cent for active knowledge. She is evidently misplaced in this upper division.

Coefficients of correlation for the lower form (fifteen pupils):

Fourth year result and active vocabulary test	·8.	P less than 0·01.
Fourth year result and passive vocabulary test....	·8.	P less than 0·01.
Fourth year result and general intelligence test	·7.	P less than 0·01.

(Two pupils were absent for the general intelligence test.)

These results are very interesting indeed. They show a definite relationship on all three scores. Those children who secured a low percentage in the vocabulary test are all found in the lower half of the class four years later. They are also of inferior general ability. Most of them in the first year were in the group which had to tackle the very large vocabulary and they do not seem to have got over it.

Groups B, C, and F.—In these three groups no significant correlations could be obtained owing to re-classification, which in the light of intelligence scores seems very faulty, and also because of the presence of pupils in the new groupings who had not been tested for vocabulary in the first year. An examination of individual scores, however, does show that those who take good places in the classes after four years of work all did well in the vocabulary tests but the reverse does not hold good.

Summing up these results, one cannot safely predict that a child with a high I.Q. and a good vocabulary at the end of the first year will do well ultimately in the subject, as much will obviously depend upon his interest being sustained and his industry. Professor Henmon reached a similar conclusion as a result of his analysis of the Cleveland and Montclair correlations between general intelligence, teachers' marks, and percentile ranks in the American Council "Alpha" French tests.* It is, however, safe to predict that children of low general intelligence are not likely to go far in the subject even if they do possess the ability to acquire vocabulary. The power to learn words, on the other hand, has been found to correlate with ultimate success in the language in three of the groups, the average coefficients being ·7 for the Passive Vocabulary, ·6 for Active Vocabulary, and ·5 for General Intelligence. It is interesting to compare these figures with those obtained by the Professor of Psychology at Princeton University.† He worked out correlations between the performance of students in the college entrance examination, an intelligence test, and an artificial language test with their subsequent achievement at college. The coefficient he obtained on this multiple result was ·533. All his students took the same test and were, of course, a selected group, seeing that they had all passed the entrance examination. The children who took the vocabulary tests were not selected in the same sense and yet the average of the coefficients of correlation obtained approximates to the American figure.

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* V. A. C. HENMON: *Prognosis Tests in the Modern Foreign Languages.*—Publications of the American and Canadian Committees on Modern Languages, Vol. XIV, page 9. (Macmillan, 1929.)

† CARL C. BRIGHAM: *The Prognosis of College Work in French.* Section III, page 63, of Vol. XIV of the American and Canadian Committees' Publications, entitled *Prognosis Tests in the Modern Foreign Languages.* (Macmillan, 1929.)

A factor which makes it impossible to draw conclusions of general validity from the vocabulary tests and the position of the pupils in French three years later is the impossibility of knowing how far the standards of the teachers correlate in regard to the tests by means of which they assess the child's class position. These are not exact standards of measurement as the vocabulary tests are. In the case of the Princeton students the tests for subsequent achievement were similar for all. In the case of these school children their subsequent achievement is measured by as many different tests as there are teachers, with a possible variation in standard as between school and school. The whole problem is one of great difficulty for the investigator. Any general conclusion could only be reached if large numbers of teachers submitted their pupils to the same test at the end of four years. A great deal of work has been done in America on this subject of Prognosis but so far with rather disappointing results, and unfortunately the correlations obtained in the present investigation are not sufficiently high to warrant reliance upon them for grading pupils. Only in the case of dull children are they a reliable guide. Thus if a child has a low intelligence quotient and does badly in the vocabulary tests that child is unlikely to find the study of French profitable.

(6) *The Effect of Method.*

The relative value of the teaching methods used is very difficult to ascertain owing to the range between schools in the number of words presented. Two methods were used and the best results obtained by each are as follows. Classes dealing with fewer than 400 words are excluded.

Direct Method.				*Mixed Method.*			
Time.	*No. of words.*	*Passive Test.*	*Active Test.*	*Time.*	*No. of words.*	*Passive Test.*	*Active Test.*
Hours.		*Per cent.*	*Per cent.*	*Hours.*		*Per cent.*	*Per cent.*
130	812	74	52	113	800	83	72
109	462	82	73	126	495	78	60
109	449	83	74	126	499	72	51

The three classes given above, being the only ones learning by the Direct Method, and the time and number of words presented being so different in each case, an analysis of the average number of words learnt per hour of instruction would make it easier to compare the relative values of the two methods.

Direct Method.				*Mixed Method.*			
Average No. of words presented per hour.		*Average No. of words learnt per hour.*		*Average No. of words presented per hour.*		*Average No. of words learnt per hour.*	
		Passive.	*Active.*			*Passive.*	*Active.*
				B.	4·0	2·9	2·0
				C.	4·0	3·0	2·3
A.	6·2	4·5	3·2	D.	9·0	4·3	2·0
I.	4·3	3·5	3·1	E.	6·0	2·8	1·9
J.	4·2	3·4	3·0	F.	5·7	3·6	3·1
				G.	7·0	5·9	5·1
				H.	4·0	3·0	2·2
				K.	4·3	2·9	3·1
				L.	6·2	4·0	2·7
				N.	6·2	3·5	2·6
Average =	4·9	3·8	3·1	Average =	5·6	3·5	2·7

On these figures the Direct Method has a slight advantage.

V.—GENERAL CONCLUSIONS.

The results of these tests would seem to establish the following points:

(*a*) Children in classes with an average age of about twelve and who spend at least two hours weekly at French are able to deal with a vocabulary which ranges from 450 to 812 words during the first year. Within this range they succeed in correctly recognising an average of 71 per cent of the words presented but can only actively produce 58 per cent of them. Individual scores range from a passive vocabulary of 789 words to 179, the average being 417 words. Active knowledge varies from 768 words to 66, with an average of 319. As no child succeeds in reaching the 800 figure this number represents the maximum size of vocabulary that pupils of this age can be expected to tackle. It is definitely disadvantageous to attempt to present 1,000 words or more as the children make much lower scores than when the figure is about 800.

(*b*) Where a reading knowledge is the main object, and adequate time is allowed (i.e., five lessons a week), there is no point in limiting the vocabulary to fewer than 800 words.

(*c*) Repetition of a small vocabulary does not bring about better results than those obtained on vocabularies round about 800 words, which evidently engender greater interest. Very high percentages were obtained by classes who tackled this number although they were in no way exceptionally endowed as regards general intelligence.

(*d*) There is a correlation of ·6 shown between the pupils' performance in the vocabulary tests and their general intelligence.

(*e*) In the case of children of poor general ability the correlations between the results of the vocabulary test and their subsequent achievement in the subject are very high, the figure being ·8. In the case of children of high or average general capacity there is great uncertainty, although the best children in the classes at the end of four years invariably have high scores in the first year vocabulary tests.

(*f*) The variability in the performance of clever children suggests the need for further tests to discover what other factors are involved in linguistic ability. It has been suggested that tests for logical deduction, strength of association, and auditory memory span might be of value. On the other hand, it is likely that a study of the volitional traits of the clever pupils might furnish a clue. For instance, linguistic success may be linked with the general capacity for taking pains, with perseverance and attention to detail, with general vitality, social traits, and other factors determining drive.

(*g*) The investigation has clearly shown the remarkable differences which exist between schools as regards the time given to the subject and the amount of vocabulary material presented. It thus furnishes corroboration for the statement of the American and Canadian Committees regarding the startling variation in standards and achievements in English schools.* Similar differences evidently exist also on the other side of the Atlantic, for in one of their publications attention is drawn to the fact that " before the modern language teacher can be relieved of his defective pupils, if linguistic defectives really exist, he must himself assist in removing the variables which obstruct a clear view of linguistic abilities."† Those who help in the field of research do enable us at least to know what those variables are.

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* Publications of the American and Canadian Committees on Modern Languages, Vol. VII, page 713.

† FIFE, R. H. : *A Summary of Reports on the Modern Foreign Languages*, page 141.—Publications of the American and Canadian Committees on Modern Languages. (Macmillan, 1931.)

In conclusion, I should like to express my thanks to Doctor Wynn-Jones for the valuable suggestions and criticisms he has made in regard to the actual conduct of the investigation and also for the material help he has given with the statistical work.

I am also greatly indebted to the following ladies and gentlemen who undertook the tedious task of keeping a record of all the words presented in the classes and whose co-operation in the schools alone made the investigation possible: Mr. C. W. Bailey, Mr. C. W. Bainbridge, Miss A. H. Bradbury, Miss M. Crowther, Mr. F. G. Everett, Sister Marie Bertrand, Miss K. Mercer, Miss A. J. McLellan, Miss J. Morrison, Miss M. Pickard, Miss M. Pollard, Miss M. H. Rider, Miss F. Steinberg, Miss Z. Taylor, Mr. W. J. Tiffin, Mr. G. Wood, and Miss D. Wood. May I also thank the head masters and mistresses who gave permission for the tests to be given.

RÉSUMÉ.

LE FARDEAU DU VOCABULAIRE PENDANT LA PREMIÈRE ANNÉE DE FRANCAIS.

A la fin de la première année de français on fit passer un test à 356 élèves dans seize classes différentes sur *tout* le vocabulaire qu'ils avaient rencontré pendant l'année. Le nombre des mots variait de 1,112 à 212, et l'accomplissement des élèves de 789 à 179 mots correctement reconnus. Ceci mena à la considération du rapport entre le temps consacré, l'intelligence générale, le succès subséquent et les résultats des tests du vocabulaire. On en tira les conclusions suivantes. Des enfants de douze ans peuvent obtenir d'assez bons résultats sur des vocabulaires de 460-800 mots. La répétition d'un vocabulaire restreint ne mène pas à de meilleurs résultats qu'un vocabulaire plus étendu. Il y a une corrélation importante entre les résultats des tests et l'intelligence générale. La note obtenue plus tard dans cette branche montre une corrélation élevée avec les tests du vocabulaire chez les enfants moins doués. Les variations chez les enfants intelligents suggerènt le besoin d'autres tests pour révéler d'autres facteurs dans l'aptitude pour les langues. Il existe des différences quant au temps consacré à cette étude, et à la quantité de la matière présentée, qui ne devraient pas exister.

ZUSAMMENFASSUNG.

DIE LAST DES WORTSCHATZES IM ERSTEN JAHR DES STUDIUMS VOM FRANZÖSISCHEN.

Am Ende des ersten Jahres des Französischen wurden 356 Kinder in 16 verschiedenen Klassen auf den Gesamtwortschatz, dem sie im Laufe des Jahres begegnet waren, geprüft. Die Anzahl der Wörter erstreckte sich von 1,112 auf 212, und die Lesitung der Kinder von 789 auf 179 Wörter, die genau erkannt

wurden. Dies hatte als Folge eine Untersuchung des Verhältnisses zwischen der verfügbaren Zeit und allgemeiner Intelligenz, und den Resultaten der Wortschatztests. Man schloss Folgendes daraus: Kinder vom 12 Lj. schneiden mit einem Wortschatz von 460 bis 800 Wörtern ziemlich gut ab. Die Wiederholung eines geringen Wortschatzes ergibt keine besseren Resultate als ein grosser Wortschatz. Es besteht eine starke Korrelation zwischen den Ergebnissen und allgemeiner Intelligenz. Die spätere Leistung im Gegenstand korreliert stark mit den Wortschatztests im Falle wenig begabter Kinder. Die Unbeständigkeit bei den begabten Kindern weist auf die Notwendigkeit hin, Tests aufzustellen, die andere Faktoren entdecken werden. Es bestehen Unterschiede zwischen der erlaubten Zeit und dem beigebrachtem Stoff, die es nicht geben sollte.

A NOTE ON THE GREYS ANALOGY TEST.

By A. H. EL KOUSSY
(*The Psychological Laboratory, University College, London*).

THE recent researches of Professor C. Spearman and his collaborators indicate that the *g*-factor, popularly known as general intelligence, may best be measured by tests of primary perception. These are now gradually replacing the verbal tests, which have been found to include a large group factor usually termed " v."*

As the name implies, these new primary perceptual tests involve the perception of lines, areas, directions, etc. Hitherto the majority of these tests have been of a visual character and concerned chiefly with the perception of space. By combining such perceptual data in a variety of ways, a number of well-graded tests have been obtained. Special complications are introduced in the test-units, which make logical processes such as abstraction, eduction of relations, and the like, necessary for the solution of the task.

The problem which emerges here is whether these new perceptual tests themselves involve a group factor that might be named, for convenience, " spatiality." Does the non-verbal spatial form of these tests give rise to a specific factor? Or are the processes of abstraction and the eduction of relations still the essential factors in the testee's performances?

The problem is one of factor analysis. To answer it requires the use of reference value tests,† i.e., additional tests as different as possible in type, form, and fundament from the tests to be analysed. Any verbal test of a suitable kind, or any test involving auditory fundaments—such as Seashore's discrimination of pitch—could be a reference value for the primary perceptual tests. But a new test has been devised which it is believed is more effective than any of these for this particular purpose. This new test, which is the subject of this note, makes use of the different intensities of greys. It has been given the name of " The Greys Analogy Test " ; and it appears that neither spatiality nor verbality influences it in any crucial fashion.

In its final form the test contains twenty-five items, carefully graded in difficulty, and designed for individuals above the age of eleven. The test takes 4½ minutes to give ; but with the older groups the time must be shortened.

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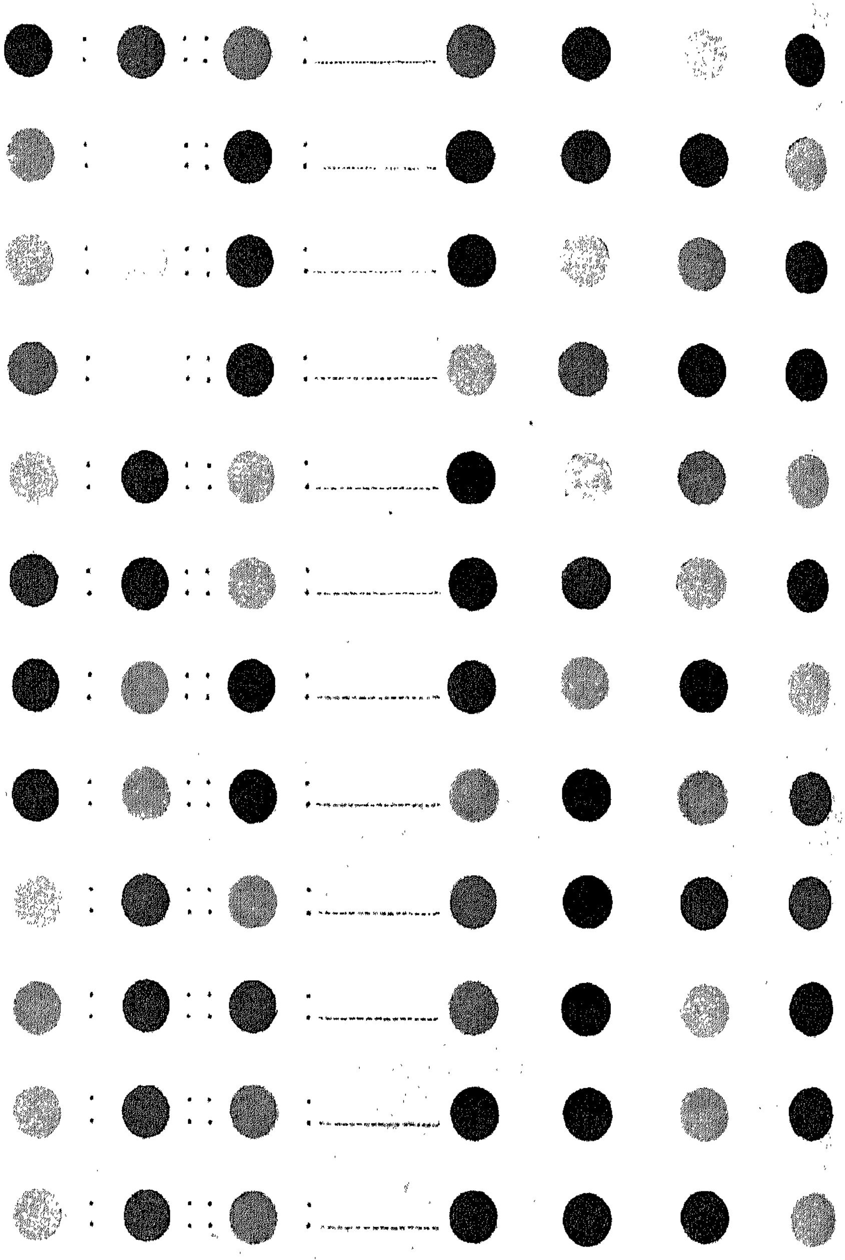
* STEPHENSON, W. : *Tetrad Differences for Verbal Sub-tests Relative to Non-Verbal Sub-tests.*—*J. Educ. Psych.*, 1931, XXII, 334.

† SPEARMAN, C. : *The Abilities of Man.*



The Greys Analogy Test was tried on a sample of 162 boys between the ages of eleven and thirteen. Its product-moment correlation with two good mental tests—the alphabetical series and Spearman's primary perceptual test, Part I—proved to be ·57±·036 and ·59±·035 respectively.

The figure shows twelve test-units. The subject is required to cross, from the four items on the right, the one item which completes the analogy. The test is preceded by a blackboard demonstration of analogy tests involving numbers, words, areas, and also a chart of Greys Analogy.

The test should be valuable for those engaged in mental testing and particularly for those concerned with factor-analysis.

In conclusion, the writer wishes to thank Dr. Wm. Stephenson for his guidance and co-operation, and Professor C. Burt for assistance in preparing this note.

For instructions, copies, and further particulars, those interested are asked to communicate with the writer.

Résumé.

UNE NOTE SUR LE TEST PAR ANALOGIE DES GRIS.

Cette note s'occupe d'un test nouveau, qu'on a inventé dernièrement, pour satisfaire au besoin de tests à la valeur desquels l'on peut se référer, quant il s'agit de l'analyse par facteurs.

Le test se sert des tons variés du gris et il a été soigneusement construit pour suffire aux conditions d'un bon test d'intelligence.

L'application du test a donné des résultats satisfaisants, lorsqu'on le compare avec deux excellents tests d'intelligence qui existent déjà.

Zusammenfassung.

BEMERKUNGEN ZUM ANALOGIETEST DER GRAUEN FARBTÖNE.

Diese Bemerkungen beziehen sich auf einen neuen Test, der wegen des Mangels an Vergleichswertests in der Faktorenanalyse neulich aufgestellt worden ist.

Der Test benutzt Grau-Intensitäten und ist sorgfältig erfunden worden, um die Bedingungen einer guten Intelligenzprüfung zu erfüllen.

Wenn man den Test verwendet hat, hat er Genügendes im Vergleich zu zwei sehr guten bestehenden Tests geleistet.

A REVISION OF THE BINET SCALE FOR INDIAN CHILDREN

(Kanarese and Marathi Speaking).

By V. V. KAMAT
(*Department of Education, University of Edinburgh*).

I.—*Intelligence testing in India.*
II.—*The present revision.*
III.—*Method of allocating the tests to ages.*
IV.—*Table of age assignments compared with previous revisions.*
V.—*Correlation of items with M.A. from the whole test, and with other criteria.*

I.—Intelligence testing in India.

Though intelligence testing after Binet has been more than two decades old in western countries, it is regrettable that very little work in this field has been done in India up to date. The result is that the vast field of research in the educational field which is open to workers in western countries is shut down for workers in India. These mental tests to be of any great value must be rendered into the vernaculars of the different provinces of India. The multiplicity of these vernacular languages need not be any great hindrance in the way of the development of tests, for each region covered by the major languages of India will be as large as a country in Europe. The most important study hitherto undertaken in this country is that of Professor C. Herbert Rice, of Lahore, who has worked in Hindustani and has adapted the Binet Scale into a Point Scale.* As Professor Rice himself says: " In the standardizing of these tests 1,070 boys, varying in age from 5 to 16, all attending school, were examined." This is, however, not a very comprehensive scale, as it is only a point scale and not an age scale. Secondly, the children tested by him were all above five years in age, and ages below this level, which are psychologically the most important, are left untouched. Lastly, all the children tested by him were boys and none of the other sex. Mention must also be made in this connection of the Government of India's Pamphlet No. 28, " Revised Series of Mental Intelligence Tests for Indian Scholars." This is an attempt to collate the fragmentary work done by various workers in all parts of India.

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* *A Hindustani Binet-Performance Scale.*—Oxford University Press. 9s.

II.—THE PRESENT REVISION.

This state of things led the writer to undertake a thorough revision of the Binet Scale. For this purpose the Stanford Revision of the scale was closely followed. The locality selected for the experiment was the town of Dharwar, in the Bombay Presidency. This is a middle-sized town with a population of a little over 30,000. The children of this town were expected to be neither very advanced like those of the busy cities like Bombay, nor very backward like those of the out-of-the-way villages. The children tested in this experiment, therefore, represent very well the general population of Indian children. The tests were first of all translated into the two languages : Kanarese and Marathi. These languages between them cater to the wants of more than half of the Bombay Presidency, a large part of the Central Provinces, the whole of the Mysore State, and a part of the Presidency of Madras. Some of the tests and material of the scale were unsuitable for Indian children, and had to be replaced, and some had to be Indianized. Thus Indian coins are substituted for American coins ; the pictures required for the Æsthetic Comparison and Missing Features Tests are given an Indian appearance, while retaining the original Binet features ; pictures representing Indian life are substituted for pictures of western life in the Description of Pictures Test ; the Slip-knot is substituted for the Bow-knot ; the Vocabulary Test is made up from the words in Kanarese and Marathi Dictionaries ; in the test of Repeating Syllables the original passages are translated into the Indian vernaculars, retaining the original meaning and difficulty and obtaining the same number of syllables ; in the test of Finding Rhymes the vernacular words selected are very similar to the original in sound, a conjunct consonant being substituted for a conjunct consonant and a nasal for a nasal ; in the words for Definitions and Differences of Abstract Terms, words having the original sense are selected as far as possible, but in some cases the negative terms are used for the positive when the positive terms were found to be ambiguous or were used in more than one sense in the vernacular ; in the Dissected Sentences, the number of words in the vernacular are kept the same as in the original as far as possible, and the sentences are dissected in the same way ; in Reversing the Hands of Clock Test 11-10 is substituted for 8-10, as the latter was found to be rather ambiguous ; the test Giving Differences between a Patil and a Kulkarni (Village Headman and Village Accountant) is substituted for the test Differences between a President and a King ; an entirely new Indian code is substituted for the English code (the characters in the Indian script are written altogether on a different style from the English script) ; a new form of Binet's Reversing Triangle in Imagination is added.

Some of the tests that were not timed either by Binet or Terman are carefully timed in this revision. This makes the tests more accurate, and, besides, if they are not so timed the examiner is at a loss to know when exactly to stop and proceed to the next test. This is a very great practical difficulty. A large number of children show an appearance of trying to solve the question and take too long a time and several times the answer is not forthcoming at all.

III.—METHOD OF ALLOCATING THE TESTS TO AGES.

In allocating the tests to the proper ages the method advocated by Professor Cyril Burt is followed as that appeared to be more scientific than that of Professor Terman. Terman selects children within two months of an age and requires 66 per cent of the children of an age to pass the test to allocate it to that age. Professor Cyril Burt requires success from 50 per cent of all the children who have just passed their last birthday and have not reached the next, to allocate it to the age reached at the latter day; that is, if a test is passed by 50 per cent of all the children between six and seven years of age, the test is located in year VII. Both the methods in practice amount to much the same thing, but the latter method has the advantage of not leaving out any of the children of a particular group of the general population, as, for example, the children of a particular locality or school. In practice, even the method of Burt cannot be literally followed, for the simple reason that a test of a particular age group, say the seventh, is not to be used for children of that age group only, but for all children close to this age group on both sides. When we consider the percentages of passes on both sides of this age group we find very wide differences. In fact, the scale is to be regarded as a continuous scale and the average percentage of passes for the entire range, or at least for a range of one or two years on both sides of the age group, should be found out. Thus now and then a test is passed by only about 20 per cent of the age group to which it is assigned, but in the next group it may be passed by 70 per cent or 80 per cent. It is thus the rising curve of percentages rather than the percentage of any one year that is to be taken into account. Burt's contention assumes that there is mathematical uniformity in the percentage of passes. The following would be such a typical case:

TEST OF YEAR VII.

Chronological Age	4	5	6	7	8	9	10
Per cent passing	0	20	40	50	60	80	100

Such is, however, never the case. The method followed in the present revision is to take the average percentage of the year of test, the year previous and the year after. This procedure is further checked by the averages of a test for all the years, and care is taken to see that this average percentage steadily alters as we ascend up the entire scale. The real criterion, however, of the accuracy of the scale is the coincidence of the mean mental age and the mean chronological age of every age group of the scale ; or, what comes to the same thing, the mean I.Q. of every age group in the different parts of the scale is as nearly as possible 100. The following table gives the Mean I.Q. and the Standard Deviation of the different groups in the entire age range.

Chronological Age.	*Mean I.Q.*	*Standard Deviation.*	*No. of Children.*
2 to 3 years 11 months	104·8	15·0	75
4 to 5 years 11 months	99·1	17·1	104
6 to 7 years 11 months	95·5	16·0	158
8 to 9 years 11 months	100·4	20·5	162
10 to 11 years 11 months	99·8	23·0	196
12 to 13 years 11 months	102·9	18·8	167
14 and above	98·8	15·2	212
For Entire Group	99·8	18·7	1074

It will be seen that the standard deviation of I.Q.'s for the entire group is 18·7, while Terman found it to be somewhere near 13 for his group. This means that the Indian children studied in the present experiment are scattered to the extent of about one and a half times more widely about the mean than Terman's American children. Further, the scatter of these children about the mean is widest in the middle of the age range, that is, between the years eight and twelve, and it becomes narrower both at the upper and the lower end. Fig. I gives graphically the distribution of the I.Q.'s of 1,074 children tested in the present study.

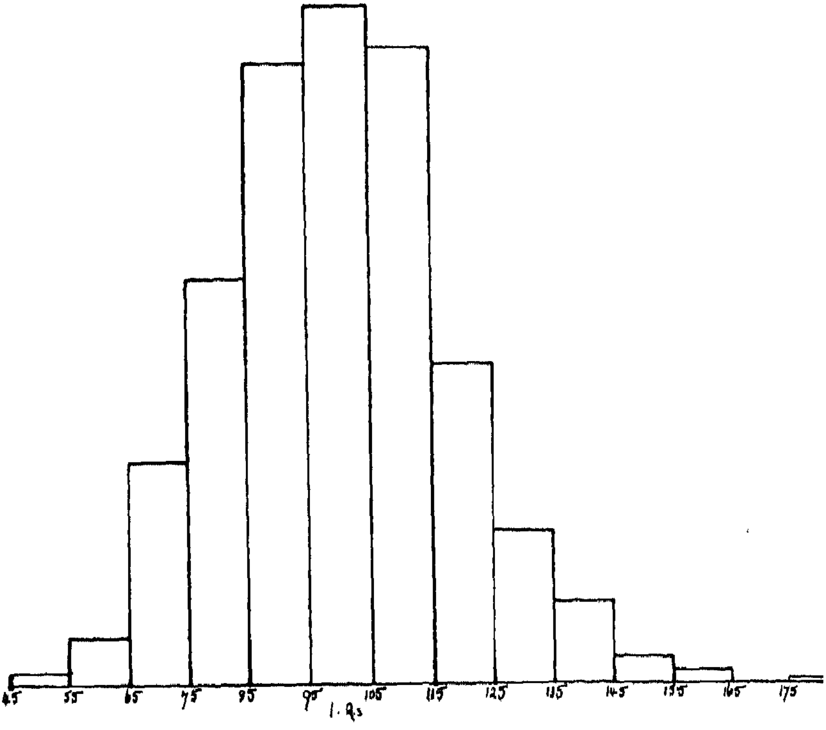

FIG. 1.

DISTRIBUTION OF 1,074 CHILDREN OF BOTH SEXES FROM TWO YEARS OF AGE TO ADULTS.

Fig. 2 gives the distribution of 745 children between 5 and 14 years of age, with Terman's distribution for the same group superposed in dotted lines for easy comparison.

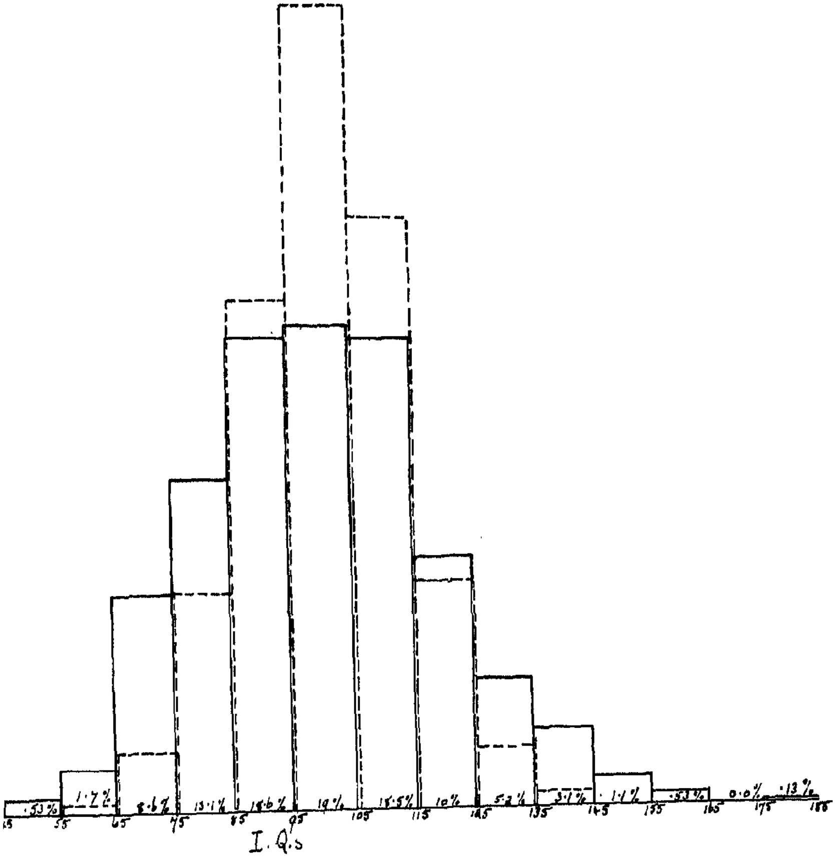

FIG. 2.

DISTRIBUTION OF I.Q.'S OF 745 UNSELECTED CHILDREN FIVE TO FOURTEEN YEARS OF AGE. TERMAN'S CORRESPONDING DISTRIBUTION IS SUPERPOSED IN DOTTED LINES.

Fig. 3 is a similar histogram worked out for adults for comparison with Terman's.

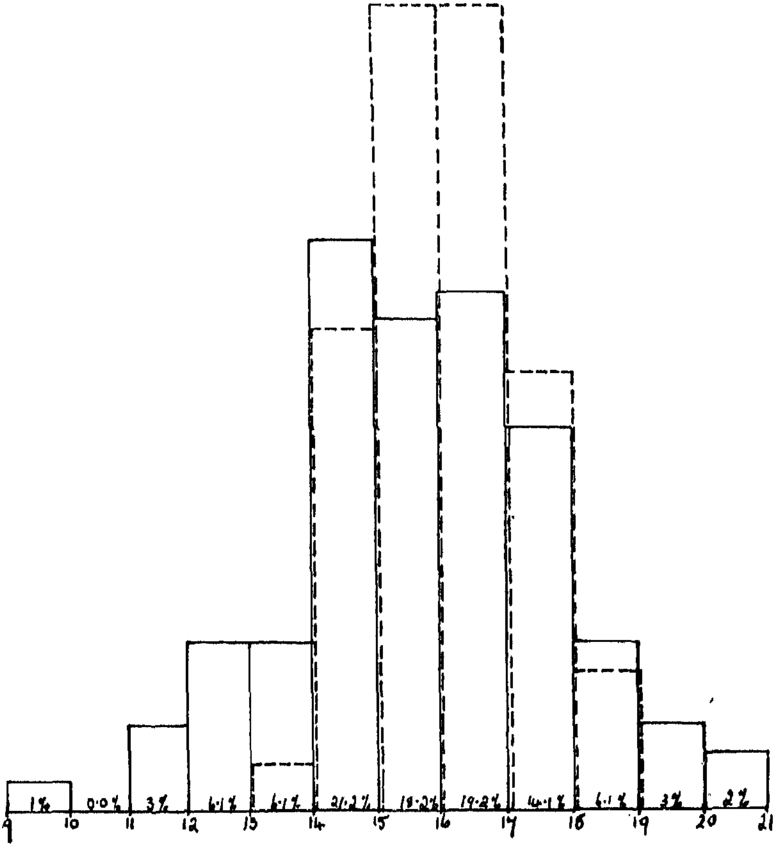

FIG. 3.

DISTRIBUTION OF MENTAL AGES OF NINETY-NINE ADULTS. TERMAN'S CORRESPONDING DISTRIBUTION IS SUPERPOSED IN DOTTED LINES.

IV.—TABLE OF AGE ASSIGNMENTS COMPARED WITH PREVIOUS REVISIONS.

The following is the scale of tests arranged as a result of the present study.

THESE TESTS ARE TO BE GIVEN IN THE VERNACULAR. THEY ARE STANDARDIZED FROM THE RESULTS OF 1,074 CHILDREN OF BOTH SEXES EXAMINED INDIVIDUALLY.

THE MEAN OF THE INTELLIGENCE QUOTIENTS OF THE CHILDREN ON THIS SCALE IS 99·8 AND THE STANDARD DEVIATION 18·7. FURTHER STATISTICS AND THE TEXT OF THE SCALE AND PROCEDURE ARE BEING PUBLISHED SEPARATELY IN BOOK FORM.

No. of Test.	*Name of Test and Year.*	*Age Assignment by Previous Workers.*					*Correlation with Mental Age.*
		Binet, 1911	*Terman (Stanford Revision).*	*Burt.*	*Bobertag.*	*Saffiotti.*	
	YEAR III.						
1	Pointing to parts of body	III	III	III	—	—	1 nearly
2	Naming objects	IV	III	III	—	—	·98
3	Repeating two digits	III	—	III	—	—	·93
4	Enumeration of pictures	III	III	III	—	—	·96
5	Repeating six to seven syllables..	III	III	IV	—	—	·89
6	Comparison of lines	IV	IV	IV	—	—	·96
Alt. 1	Giving sex	IV	III	III	—	—	·95
Alt. 2	Giving proper name	—	—	—	—	—	1 nearly
	YEAR IV.						
1	Repeating three digits	IV	III	IV	—	—	·93
2	Discrimination of forms	—	IV	—	—	—	·98
3	Comprehension, first degree	—	IV	—	—	—	·93
4	Repeating 12 to 13 syllables....	V 10 syl.	IV	V 10 syl.	V 10 syl.	—	·89
5	Counting four pice	V	IV	IV	V	—	·98
6	Copying a square	V	IV	V	V	VI	·96
Alt.	Comparison of two weights	V	V	V	V	V?	·84

No. of Test.	*Name of Test and Year.*	*Age Assignment by Previous Workers.*					*Correlation with Mental Age.*
		Binet, 1911	*Terman (Stanford Revision).*	*Burt.*	*Bobertag.*	*Saffiotti.*	
	YEAR V.						
1	Æsthetic comparison	VI	V	IV	VI	VI	·81
2	Definitions: use	VI	V	VI	V	VII	·85
3	Three commissions	VII	V	V	VI	VI	·91
4	Right and left	VII	VI	VI	VII	—	·88
5	Naming four coins	—	VI	VI	VII?	—	·89
6	Counting thirteen pice	VI	VI	VI	VI	VIII	·98
Alt. 1	Forenoon and afternoon	VI	VI	V	VII	VI	·8
Alt. 2	Giving family name	III	III	III	—	—	·92
Alt. 3	Giving age	—	V	V	VI	—	·56
	YEAR VI.						
1	Repeating four digits	—	IV	V	V	—	·93
2	Comprehension, second degree	—	VI	—	—	—	·55
3	Divided card	V	V	VI	VI	VIII	·85
4	Giving number of fingers	—	VII	VI	VII	—	·93
5	Description of pictures	VII	VII	VI	VII	—	·64
6	Missing features	VIII	VI	VII	VII	VIII	·75
Alt.	Naming colours	VII	V	V	VIII	VIII	·79
	YEAR VII.						
1	Repeating sixteen to eighteen syllables	—	VI	VI	VI	—	·89
2	Copying a diamond	VI	VII	VI	VII	VIII	·84
3	Repeating three digits reversed	—	VII	—	—	—	·7
4	Naming days of week	—	VII	VI	VIII	—	·86
5	Counting backwards 20 to 1	VIII	VIII	VIII	VIII	VIII	·94
6	Giving differences from memory	VIII	VII	VII	VIII	VII	·79
Alt.	Giving day of week and day of month	—	—	—	—	—	·87

Name of Test and Year.	*Age Assignment by Previous Workers.*					*Correlation with Mental Age.*
	Binet, 1911	*Terman (Stanford Revision).*	*Burt.*	*Bobertag.*	*Saffiotti.*	
YEAR VIII.						
Finding value of coins	VII	—	VII	VII	X	·96
Repeating five digits	VIII	VII	VI	VII	VIII	·93
Comprehension, third degree....	IX?	VIII	VIII?	VIII?	VIII?	·78
Definition, superior to use	IX?	VIII	IX?	IX?	—	·83
Naming six coins	IX?	VIII	IX?	X?	—	·9
Reading and report two facts, ten errors, two minutes	—	—	VIII	IX?	—	·9
Tying a slip-knot	—	—	—	—	—	·55
Ball and field	—	VIII	—	—	—	·71
YEAR IX.						
Repeating four digits, reversed ..	—	IX	—	—	—	·7
Making change	IX?	IX	VIII?	IX?	XI?	·9
Giving similarities; two things..	—	VIII	—	—	—	·84
Using three words in a sentence..	XII	IX	XI	XI-XII	—	·87
Reading and report: six facts, five errors, one minute........	—	—	IX	X?	—	·81
Free association: thirty-five words in three minutes......	—	—	—	—	—	·75
Vocabulary, twenty words	—	—	—	—	—	·89
YEAR X.						
Arranging five weights	X	IX	X	IX	VIII	·57
Repeating twenty to twenty-two syllables	—	X	—	—	—	·89
Naming the months	IX	IX	IX	X	IX	·84
Drawing designs from memory ..	X	X	X	—	—	·78
Finding rhymes	XV	IX	XII	XI-XII	—	·78
Reading and report; eight facts, two errors, forty seconds......	—	X	—	—	—	·83
Vocabulary, twenty-five words ..	—	—	—	—	—	·89
Giving month and year	VIII?	IX?	VIII?	IX?	VIII?	·91

No. of Test.	*Name of Test and Year.*	*Age Assignment by Previous Workers.*					*Correlation with Mental Age.*
		Binet, 1911	*Terman (Stanford Revision).*	*Burt.*	*Bobertag.*	*Saffiotti.*	
	YEAR XII.						
1	Detecting absurdities	X	X	XI	XI-XII	XI	·89
2	Construction puzzle	—	X	—	—	—	·85
3	Defining abstract words	XII?	XII	XIV?	XI-XII?	—	·88
4	Repeating five digits backwards..	—	XII	—	—	—	·7
5	Interpretation of fables, four marks	—	XII	—	—	—	·94
6	Interpretation of pictures	XV	XII	XII	—	—	·84
Alt. 1	Vocabulary, thirty words	—	—	—	—	—	·89
Alt. 2	Repeating six digits one out of three	—	X?	VIII	X	—	·93
Alt. 3	Comprehension, fourth degree....	X	X	XI	XI-XII	XI?	·85
	YEAR XIV.						
1	Induction test	—	XIV	—	—	—	·61
2	Dissected sentences	XII	XII	XII	XII	XIV	·88
3	Arithmetical reasoning	—	XIV	—	—	—	·77
4	Problem of enclosed boxes	—	XVI	—	—	—	·61
5	Giving similarities : three things..	—	XII	—	—	—	·88
6	Ball and field : superior plan....	—	XII	—	—	—	·66
Alt.	Vocabulary, forty words	—	—	—	—	—	·89
	YEAR XVI (ADULT).						
1	Interpretation of fables : eight marks	—	XVI	—	—	—	·72
2	Reversing hands of clock	—	XIV	—	—	—	·82
3	Giving differences : Patil and Kulkarni..................	Ad.	XIV?	XVI?	—	—	·58
4	Repeating six digits reversed....	—	XVI	—	—	—	·7
5	Problem questions	XV	XIV	XIII	—	—	·8
6	Repeating seven digits one out of two	XV?	XIV	XI?	X	—	·93
Alt. 1	Vocabulary, forty-five words	—	—	—	—	—	·89
Alt. 2	Free association : sixty words in three minutes	XII	X	XI	—	—	·59

No. of Test.	*Name of Test and Year.*	*Age Assignment by Previous Workers.*					*Correlation with Mental Age.*
		Binet, 1911	*Terman (Stanford Revision).*	*Burt.*	*Bobertag.*	*Saffiotti.*	
	YEAR XIX (SUPERIOR ADULT).						
1	Using a code	—	—	—	—	—	·89
2	Ingenuity test	—	XIX	—	—	—	·65
3	Differences between abstract terms	Ad.	XVI	XV	—	—	·78
4	Binet's paper-cutting test	Ad.	XIX	XV	—	—	·63
5	Repeating 30 syllables	XV 26 syl.	XVI 28 syl.	XIV 26 syl.	X 26 syl.	XII 26 syl.	·89
6	Reversing triangle in imagination: New Form	—	—	—	—	—	·55
Alt.	Vocabulary, fifty-five words	—	—	—	—	—	·89
	YEAR XXII (VERY SUPERIOR ADULT).						
1	Comprehension of physical relations	—	XVI	—	—	—	·75
2	Repeating eight digits	—	XIX	—	—	—	·93
3	Repeating thought of passage heard	Ad.	XIX?	XVI	—	—	·82
4	Reversing triangle in imagination: Binet's Form	Ad.	—	XV	—	—	·83
5	Repeating seven digits reversed	—	XIX	—	—	—	·7
6	Free association: eighty words in three minutes	—	—	—	—	—	1 nearly
Alt.	Vocabulary, sixty words	—	—	—	—	—	·89

N.B.—The sign (?) indicates that the results are not strictly comparable for some reason or other.

It will be seen that I have added one more age group, viz., for Very Superior Adult (Age XXII) to get the upper end extended as far above the mean I.Q. as the lower end is below the same.

V.—CORRELATION OF ITEMS WITH M.A. FROM THE WHOLE TEST, AND WITH OTHER CRITERIA.

Lastly, to test the validity of the tests we have not only to see that the percentage of children that pass the test should steadily increase from year to year, but we have to see that each test correlates highly with other known valid criteria of intelligence. We have thus to correlate each of these tests with teacher's estimate or with the mental age of the child as determined by the scale as a whole. Some tests that were found to be of doubtful value from this point of view are relegated to the group of alternative tests. From this point of view Binet's Test of Free Association—giving sixty words in three minutes—was found to be most deceptive. From the percentage required for passing this test it was found to be difficult even for the Adult Group ; but a few children even of a low mental age gave sometimes a score much beyond sixty. The difficulty then arises as to whether we should give a plus for this test in the sixteenth year group even though the child may fail in all the tests, as, for instance, from the tenth year onwards. The test has, therefore, been put in the sixteenth year only as an alternative test. The mean and median scores of this test for all ages have also been worked out, and, as a result, the test is included in the ninth year group with a score of thirty-five and in the Very Superior Group with a score of eighty words. At these two extremes it is found to be a sufficiently valid test.

The correlations of the individual tests with Mental Age as determined by the scale as a whole are given in the last column of the " Table of Age Assignments."

RÉSUMÉ.

UN RÉMANIEMENT DE L'ÉCHELLE BINET POUR DES ENFANTS INDIENS.

L'auteur a traduit les tests de l'échelle Binet en deux langues indiennes, le Karanese et le Marathi, et il a également adapté la matière des tests (images, etc.) aux conditions indiennes.

Il les a expérimentés sur 1074 enfants et jeunes personnes de la région de Dharwar, Bombay Presidency, et, par des méthodes basées sur celles du Professeur Cyril Burt, il a distribué les tests de l'échelle à des âges variés.

Il donne en forme de tableau sa propre distribution en ajoutant, comme base de comparaison, ceux d'autres travailleurs. Son test, ainsi construit, fournit un I.Q. moyen de 99·8 pour le groupe entier de 1074 sujets, avec un écart étalon de 18·7, la moyenne oscillant (à cause de l'échantillonnage) entre 95·5 et 104·8 chez les différents groupes d'âge, mais restant, pour la plupart, assez stable avec l'âge croissant. L'auteur a ajouté encore un groupe de tests pour Adultes d'une Supériorité Marquée (âge 22) afin d'étendre symmétriquement l'envergure du quotient d'intelligence au dessus de la moyenne comme au dessous d'elle. Des chiffres supplémentaires et le texte du test seront publiés séparément.

ZUSAMMENFASSUNG.

EINE BEARBEITUNG DER BINETSKALA FÜR INDISCHE (KANARESISCH UND MARATHI SPRECHENDE) KINDER.

Der Verfasser hat die Einzelheiten der Binetintelligenztests in zwei indische Sprachen, Kanaresisch und Marathi, übersetzt und hat auch den Stoff der Tests (Bilder, usw.) indischen Zuständen angepasst. Er hat die Tests 1074 Kindern und jungen Menschen in der Dharwargegend, Bombayer Präsidentschaft, gegeben und durch Methoden, die auf denen des Professors Cyril Burt basieren, hat er die Einzelheiten des Tests verschiedenen Altersstufen angepasst.

In einer Tafel gibt er seine eigenen Aufgaben für verschiedene Lebensalter samt denen vorhergehender Forscher zum Vergleich. Sein auf diese Weise aufgebauter Test gab einen Mittelwert-Intelligenzquotienten von 99,8 für die ganze Gruppe von 1074 Kindern mit einer Standardabweichung von 18,7 Punkten; wegen der Stichproben variierte der Mittelwert zwischen 95,5 und 104,8 bei den verschiedenen Altersgruppen, aber im grossen und ganzen blieb er mit zunehmendem Alter stetig. Der Verfasser hat noch eine Testgruppe hinzugefügt, und zwar für höher begabte Erwachsene (Alter 22), um das oberste Ende der Rangordnung des Intelligenzquotienten ebenso weit über den Mittelwert hinauszuschieben wie das unterste Ende darunter liegt. Weitere Statistiken und der Text des Tests sollen getrennt veröffentlicht werden.

A NEW INSTRUMENT FOR RECORDING HANDWRITING PRESSURE.

BY P. E. VERNON*

(From the Maudsley Hospital, London).

THE principles of teaching handwriting have been influenced considerably by experimental analyses of the speed and pressure of various graphic movements, carried out by Meumann[7], Drever[4 5], and Freeman[6]. Records of handwriting pressure are of value, also, in a number of psychological investigations, including the following:

(*a*) Mental work is usually accompanied by changes in muscular tension. Handwriting pressure, as an expression of this tension, has been shown to vary with the difficulty, the speed of solution, etc., of written tasks. It may also be affected by variations in mood (cf. Bills[2]; Downey[3]).

(*b*) In the identification of scripts for legal purposes it is found that curves of pressure are so markedly characteristic of the individual that they are one of the most difficult features to imitate or to disguise (cf. Osborn[8]; Saudek[10]).

(*c*) Both in organic and functional, mental or nervous disorders, the pressure curves are affected (cf. Downey[3]).

(*d*) The character and temperamental traits of normal subjects seem to be expressed in certain quantitative and qualitative aspects of handwriting pressure (cf. Allport and Vernon[1]).

Previous techniques for obtaining such records are, however, open to many objections. The author has described these techniques elsewhere (see bibliography 1, pp. 51-61), thus a brief summary will suffice here.

I.—MICROSCOPIC INSPECTION OF THE SCRIPT.

II.—THE CARBON PAPER METHOD.

Both are of no value for accurate research.

III.—THE KRAEPELIN BALANCE.

The Subject writes on a surface which yields by an amount proportional to the pressure he exerts; the depressions are recorded on a kymograph through a mechanical or air (tambour) connection. A simple type of apparatus is shown diagrammatically in Fig. 3. This method was used in almost all pre-war German and American investigations; and in the opinion of the author it still gives the clearest records (cf. 1, p. 56). But the results obtained with it suffer from the following drawbacks:

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* This article was written during the author's tenure of the Pinsent Darwin Studentship in Mental Pathology.

(*a*) Subjects dislike writing on a yielding surface and may find it difficult to do so naturally.
(*b*) If the surface is supported on springs, it is not easy to eliminate resonance effects which distort the tracings.
(*c*) Since the weight of the hand itself must not be allowed to influence the records, the hand must be supported above, or outside the edges of, the writing surface.
(*d*) The method only gives records of point pressure (i.e., of the point of the pen or pencil on the surface), not of grip pressure (i.e., of the thumb and first finger on the pen or pencil).

IV.—Stylus Methods.

Stylus methods were introduced by Drever in order to overcome these disadvantages. Grip pressure is easily recorded by means of a stylus whose walls are of rubber, with a thin rigid shaft in the centre;

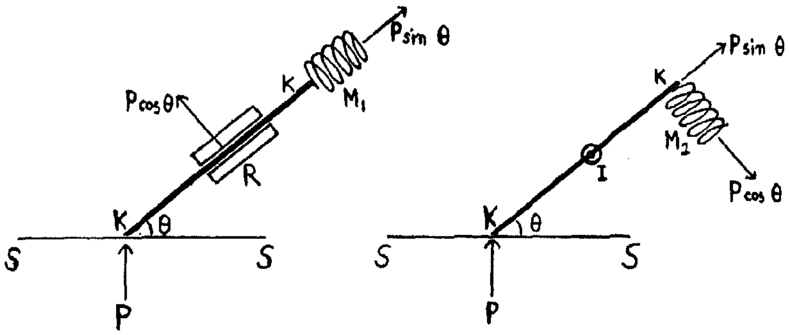

Fig. 1.

Fig. 2.

Diagrams of styluses for recording handwriting pressure.

the enclosed air chamber is then connected by a narrow rubber tube to a tambour and recording kymograph. Point pressure, however, offers more difficulties, because it is actually applied in a direction vertical to the writing surface, whereas the stylus is naturally held at a considerable angle from the vertical. Figures 1 and 2 illustrate diagrammatically two possible mechanisms which may be embodied in a stylus. In all three figures SS is the writing surface, KK the pen or pencil which is held at an angle θ to SS. In the first mechanism KK slides in an outer shaft or holder R, and compresses the spring M_1; but in the second mechanism KK is pivoted about an axis I. Now it is desired to record the point pressure P. The amount of compression of M_1 will, of course, depend upon P sin θ, that of M_2 on P cos θ. As θ is normally about 40°*, ·64P will be the effective pressure against M_1, and ·76P will be worse than wasted since it will press KK against the upper wall of the holder R, and will give rise to such friction that small variations in P may fail to be recorded. Yet previous styluses have usually employed this mechanism (cf. 5, 11). In the second mechanism, however, ·76P is the effective pressure against M_2, and ·64P is wasted by pressure on the axis I; as this axis is of very snall diameter the friction effect is negligible. The author, therefore, designed a stylus based on this second principle, which also registers grip pressure.† It has been constructed by Messrs. C. F. Palmer, from whom duplicates may be obtained. Fig. 4 shows it in longitudinal section, with two cross sections below.

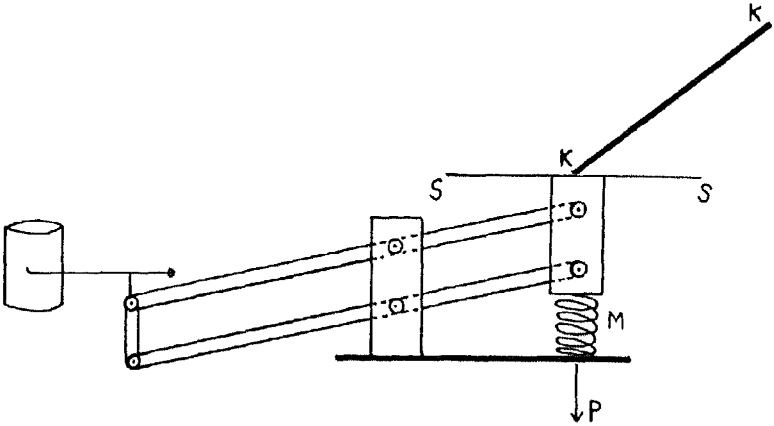

FIG. 3.

DIAGRAM OF THE KRAEPELIN BALANCE METHOD OF RECORDING HANDWRITING PRESSURE.

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* Among ten educated subjects the average value of θ was 39·6°, the mean variation 2·85°.

† Román-Goldzieher's "Graphodyn" stylus uses this mechanism (9); but it has an external tambour instead of the enclosed air bladder, NN, described on page 314; and it does not record grip pressure.

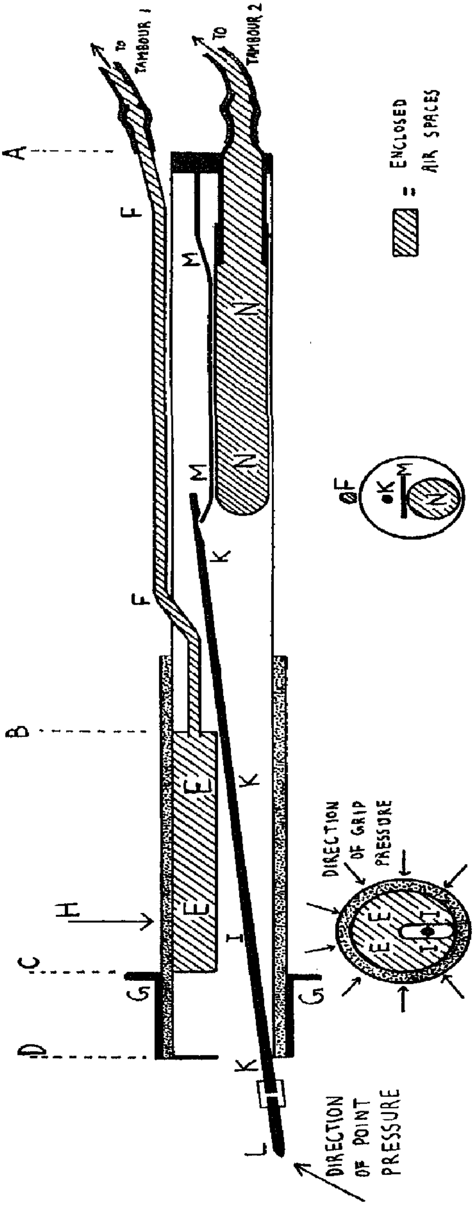

FIG. 4.

LONGITUDINAL AND CROSS SECTIONS OF STYLUS FOR RECORDING HAND-WRITING PRESSURE.

The solid, non-moving portion of the instrument consists of a metal tube $\frac{7}{16}$-in. in diameter in its upper part AB, and at its extreme lower part CD, but with an intermediate narrow oval section BC, measuring $\frac{1}{4}$-in. by $\frac{1}{8}$-in. A rubber tube whose inner bore is also about $\frac{7}{16}$-in. is fixed with airtight joints just above B and below C, so that an enclosed air space EE is left outside the oval tube. This space connects through a separate narrow metal tube FF, and through flexible rubber tubing, to one of two tambours. Owing to the presence of a metal collar GG, the Subject is forced to hold the stylus with his fingers at about the point H, and the strength of his grip is therefore recorded on a smoked drum by the lever of the first tambour. The writing lead L is fixed to a long, straight rod KK ($\frac{3}{32}$-in. in diameter) which is pivoted on an axis at I within the oval tube. Thus when the Subject writes, the lead is pressed up, and the upper end of the rod moves downwards against a metal tongue or spring MM ; this spring causes the lead to return to its original position when the point pressure is released. The same spring presses against a thin rubber bladder NN, of the type used in self-filling fountain pens. It is filled with air, and its upper end is connected by a metal tube, and thence by flexible rubber tubing, to the second tambour. The overall length of the stylus is $6\frac{1}{4}$-in. ; its thickness is about equal to that of a Duofold fountain pen, so that it can be held quite comfortably. Since it is essential that the axis I should be parallel to the plane of the writing surface, the word TOP is stamped on the collar GG ; the stylus is held with this word uppermost.

The air spaces (EE and NN) are both small, hence small recording tambours must be employed. The author uses Palmer's C 10 tambours and obtains satisfactory tracings. He has calibrated the point pressure records by means of a Kraepelin balance apparatus. Up to 300 gms. the relation between point pressure and kymograph readings is approximately linear ; with a tambour lever that magnifies twenty-three times the height of the tracings is roughly 1 mm. for every 40 gms. of pressure. Above 300 gms. the height of the tracing shows a progressively smaller increase for equal increases in point pressure ; thus the height which corresponds to 500 gms. is 1 cm. instead of 1·25 cms. Nevertheless the instrument covers the greater part of the range of ordinary writing pressures. In an earlier investigation with twenty-five male American Subjects, probably a representative group, the median point pressure was 120 gms., the range for different Subjects varying from 50 to 390 gms.* The grip pressure records cannot be calibrated, but they are of a similar order of magnitude.

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* Individual letters were, of course, often written with greater or with less pressure than these figures. But since it is better to base measurements of a Subject's habitual pressure on the median than on the average reading, inaccurate records of occasional very heavy strokes do not usually affect the result.

There are still, it must be admitted, certain disadvantages in the use of this instrument, though they are probably less serious than the objections to the other available techniques.

(*a*) The two rubber tubes which are led off from the top cause some inconvenience at first to the Subject, but he soon ceases to notice them.

(*b*) The writing point yields under pressure, but as the amount is scarcely 1 mm. at 300 gms. pressure, it is hardly noticeable. It certainly seems less disconcerting than an equal yield of the whole surface in a Kraepelin balance.

(*c*) The height of the tracings is proportional not to P but to P cos θ. This factor may be allowed for by measuring the angle at which the Subject habitually holds the stylus. In any case it does not affect the important intra-individual pressure variations, only the inter-individual differences.

(*d*) The rubber parts of the instrument are perishable, but they are standard products and can be renewed.

(*e*) Owing to the lightness of the tambours and the small volume of the air spaces relative to the volume of the connecting tubes, the detailed pressure variations within single letters tend to become obliterated. By keeping the connecting tubes as short as possible, say 2-ft., and by attaching writing points of low resilience to the tambour levers, this defect can be greatly reduced.

(*f*) It has already been pointed out that tambours do not register very effectively at high pressures.

(*g*) Tambours tend to leak, so that the instrument should not be used for much more than a minute at a time.

The last three difficulties could be overcome, and greater sensitivity could be achieved, by substituting U-tube manometers for the tambours. Continuous photographic records of the level of liquid in these manometers could then be obtained, instead of smoked drum records.

SUMMARY.

Records of handwriting pressure, which are of significance in several branches of psychology, have hitherto chiefly been obtained by the Kraepelin balance apparatus. Alternatively a stylus instrument has been employed. Both these techniques suffer from various drawbacks, but a new type of stylus, which is fully described in this article, is comparatively satisfactory.

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Résumé.

UN INSTRUMENT NOUVEAU POUR ENRÉGISTRER LA PRESSION DE L'ÉCRITURE.

L'enrégistrement de la pression de l'écriture qui a une certaine signification dans plusieurs branches de la psychologie s'est fait jusqu' ici surtout au moyen de l'appareil d'équilibre Kraeplin. Dans d'autres cas on a employé un instrument du type style. Ces deux techniques montrent différents désavantages, mais un type nouveau de style, qu'on décrit en détail dans cet article, donne des résultats relativement bons.

Zusammenfassung.

EIN NEUES INSTRUMENT ZUM MESSEN DES DRUCKES DER SCHREIBENDEN HAND.

Kurven des Druckes der schreibenden Hand, die auf vielen Gebieten der Psychologie von Bedeutung sind, hat man bisher hauptsächlich durch die Kraepelin'sche Schreibwage erreicht. Auch wurde ein Kurvenschreiber benutzt. Beide Methoden leiden an verschiedenen Nachteilen, aber eine neue Art Kurvenschreiber, der in dieser Abhandlung ausführlich geschildert wird, ist verhältnismässig zuverlässig.

GUILD GUIDANCE CLINICS.

(A quarter century of development, by George S. Stevenson and Geddes Smith. Published by the Commonwealth Fund and Humphrey Milford. 6s. 6d.)

"THE development of child guidance clinics has been a popular and significant phase of the mental hygiene movement of the last quarter century. This book attempts to trace the major patterns of that development from its origins in 1909 and to report briefly some currents of present day thinking about child guidance."

This object, as described in the foreword, is admirably attained in the book before us, and in reviewing a work of this kind it only suffices to give a brief synopsis, and to stress the chief lessons conveyed, in order to indicate its scope and value.

Our only regret must be that it is confined to America and American methods alone.

It is first pointed out that in adopting the term child guidance, the clinic has of course given a restricted meaning to a term of wide applicability ; parents, schools, courts, medical and social agencies of various types have long been engaged in guiding children. Child guidance clinics however are designed to supplement these agencies and provide a synthesis of various techniques. It is an art which not only studies and treats children, but seeks to educate the community, and to reveal, through the first hand study of individual children, the unmet needs of groups of children.

The interpretation of behaviour in terms of early influences rather than fatalism or heredity has, in recent years, been given more emphasis and an immensely enriched context. The combination of psychological, social, and psychiatric techniques has been the mainspring in the elucidation of these influences, and the child guidance movement has merely recognised and used this fact.

It is interesting to note that although the pioneer clinic of this kind, namely the Chicago Juvenile Psychopathic Institute, was founded by Dr. Healy in 1909, the term child guidance clinic was not coined till 1922. In the latter year several demonstration clinics were started, mostly in connection with children's courts ; ten years later we find 232 clinics in America alone. This brings us at once to the significant fact that in the majority of cases the association of clinics with juvenile courts has been a comparative failure, and that social agencies and schools, also more latterly hospitals and university medical schools, have been found to be a better medium of approach to the problem. For this various reasons are given ; one is that cases brought to the courts are already hardened and in some cases past prevention (although this strikes us as doubtful) ; also that political and social considerations and the " known inertia of the bench " have created obstacles. To this there have, of course, been notable exceptions, as in Cleveland, Chicago, and Boston.

" The clinic teaches by serving some children and, by teaching, serves all children "; this phrase conveys succinctly the very important lesson that it is not only in the actual handling of cases that a clinic justifies its cost to the community but in the educational work which it undertakes. It is estimated that a staff consisting of full-time psychiatrist, psychologist, two or three psychiatric social workers and two or three clerks can handle something like 300 new cases per year. The cost of this is heavy but cannot be computed as the cost per child, since the service given to individual cases is so closely involved in educational services to the community ; in other words in spreading, by practical examples, the lessons of child guidance among all members of the community who have to do with the care and education of children. This is a very important point to bring home to Committees and other bodies who are contemplating the establishment of such a comparatively new undertaking as a child guidance clinic, and it is a point which is repeatedly stressed in this book.

Now for a few practical details. The large majority of children come to the clinic between their fifth and fifteenth year, the largest group being ten to fourteen. The clinic sees more boys than girls. The relative numbers referred from social agencies, schools, courts, parents, etc., varies with " the orientation of a given clinic to its community," and averages are therefore misleading. In a typical clinic the length of treatment for " full-service " cases would be from one to fifty-three months with an average of nineteen months ; on " short-service " cases the average would be six months. (This appears to us somewhat longer than the average of present day clinics.)

The approach to the case is next considered, and it is truly remarked that differences in the philosophical attitude of different individuals account for the wide variations in the practice of psychiatry. Nevertheless all are agreed on viewing each problem as an " inseparable part of the individual's total functioning."

It may be said that there are two main currents of thought with regard to treatment ; in one a more active approach is involved, the clinic here assuming a definite line of treatment and being responsible for carrying it out; in the other the attitude of the clinic is more passive, reliance being chiefly placed on the rapport established between the patient and the worker. Whatever attitude one adopts, it seems essential to take the case as one finds it, and allow a large measure of elasticity with regard to method and technique. The clinic cannot, however, take the risks involved in a far-reaching exploration of unconscious processes. Another important point is the danger of proceeding too rapidly in any part of the procedure.

With regard to selection of cases, there is only one valid reason for refusal of those referred and that is mental defect; apart from this there are cases one would like to refuse but it is increasingly the practice to find some way of helping nearly everyone who comes to the clinic. It is generally the experience of clinics, however, that the longer they are established the more suitable are the cases referred: the community becomes educated up to the clinic.

As regards the types of treatment, these are roughly divided into four: (1) full service, (2) co-operative service, (3) special service, (4) diagnostic service.

Full service speaks for itself and involves, or may involve, all the possible resources of the clinic.

Co-operative service is a somewhat newer development, and implies that treatment is left, to a very large extent, to the individual already concerned with the case, e.g., the teacher or probation officer, but it is always in constant touch with the clinic.

Special service is that where advice only is given or partial treatment used. It will naturally have many varieties.

Lastly, *Diagnostic service* implies that a fairly rapid study is made of the case and a report given to the agency concerned, without the inception of treatment.

Of great interest is the account given on page 90 of the rationale of a certain type of direct therapy, involving the use of play material, as used at the Philadelphia clinic; the importance of certain restrictions, such as that of time, in bringing out the child's reactions, are here stressed. Other clinics too use play as a means of establishing habits of social adjustment.

The whole approach to childhood neurosis and behaviour problems is thus a very novel one, and it would be strange if it met with no opposition. It is hinted that the pediatrician is sometimes the hardest to convince of its value, although there need be no rivalry between pediatrics and child psychiatry; since the latter, involving as it does the school and parental relationships as well as the child, begins where the former leaves off. It has already been said that education of the community is one of the primary functions of the clinic, and this is treated at some length. It is noted that the utility of study groups, lectures, etc., is sharply limited when it is a question of parents, for the question of handling their children is a matter of the heart rather than the head: an actual problem in their own children teaches far more than any amount of reading and listening. The "co-operative case" previously mentioned is considered to be one of the most valuable points of educational contact between the clinic and workers from other agencies.

There is no room here to discuss the question of the establishment of clinics in communities of various sizes, but we pass on to the final chapters on evaluation of results and on the trends and possibilities of the future. The difficulty, both of estimating results and of carrying out research, is indicated. Only rough clinical estimates of success or failure can be given and these are necessarily subjective. The word "cure" cannot be used: one can only cure a specific disorder. Using the word "success" (we would prefer "adjustment") it is estimated that, generally, "successful" and "partially successful" cases account for more than three-fourths of the total, with the "partial" group in excess of the "successful." After a lapse of a few years it is impossible to isolate the effects of the treatment from the many other influences that come into play.

The book ends with a neat summing up: "The child guidance clinic is more than a therapeutic agency. It is a tool for synthesizing the most promising approaches to the problem of behaviour and personality in childhood, and for demonstrating the synthesis to the professions concerned with those problems. It is a laboratory in which new leads may be found for the study of the child. As such, it has a place in social evolution."

It is hoped that this attempted synopsis may stimulate all those who are in any way concerned with the subject, to give the book itself their close attention, for they will be amply repaid.

C. L. C. BURNS.

BOOK REVIEWS.

Training of Taste in the Arts and Crafts: By J. LITTLEJOHNS, R.I., R.B.A., *with an Account of Investigations on Children's Preferences*, by A. NEEDHAM, F.R.S.A. (Sir Isaac Pitman and Sons, Ltd. Pp. 152. 12s. 6d.).

This book is especially interesting as indicating the fact that artists and practical teachers of Art are realizing more and more the value of a psychological study of their pupils and, if necessary, the breaking with traditional ideas as to teaching or at least, the careful examination of tradition. The book is of chief interest, perhaps, to teachers of art, but it contains material of value also for the student of the psychology of æsthetics. The method of enquiry followed is the already long recognized one of presenting two or more pictures to children and asking for their preferences and for "reasons why." These writers seem to be unfamiliar with the fact that investigations of this kind have already been carried on years ago in this country, in America and elsewhere. For the psychologist the book would have been much more useful if the results had been more carefully analysed and set out sometimes with greater exactitude. For example, in the early part of the records we are told that tests were made in boys' secondary schools, boys' and girls' elementary schools, and boys' and girls' central schools and so forth, but nothing is said about the total number of children or about the number at respective ages. We are simply told broadly that the children were divided into two groups—the younger about eleven, and so forth. The tables also give percentages of replies of different ages and different groups without saying what is the number of children on which percentages are based—an exasperating procedure to the statistical psychologist. Finally the inexact references to the types of pictures sometimes leads to generalization which is surely invalid, as, for example, that "pictures of women do not interest boys," the reference of course being to certain particular pictures and to boys of a certain age. Similarly the generalization that the intelligent children display superior taste would be of greater value if the basis on which intelligence is estimated were made more clear. Apparently it was really educational progress in mathematics, English, etc. (p. 27). An interesting fact was that those who were "not good at drawing" made equally tasteful selections as those who were (p. 27).

A useful part of the enquiry was that which estimated the effect of the repeated study of a picture over a period of about six weeks, one general result being that the older boys gave more votes in favour of the better pictures as time went on—a confirmation of earlier investigations which have shown that frequently good pictures do not lose but gain by repetition. The opinions of boys of fourteen to fifteen on the pictures reproduced in *Pictorial Education* as a result of the Board of Education's pamphlet on school pictures are of peculiar interest. The authors conclude that the results are dramatically opposite to the official pronouncement by educational experts, namely that all school pictures should be acknowledged masterpieces; but the psychological basis of this argument needs much fuller discussion than that given by the authors.

We feel, however, that we have been perhaps unduly critical, looking at the book mainly from the point of view of the psychological investigator. Undoubtedly the book should be a great stimulus to all teachers of art in any school.

We may add that it is admirably produced and printed, with a large number of excellent reproductions of pictures, and the text is written in a clear and interesting manner.

The First Two Years—A Study of Twenty-five Babies. Volume III: Personality Manifestations: By MARY SHIRLEY. (The University of Minnesota Press, Minneapolis. Pp. 228. 2 dollars 50 cents.)

This is the third volume based upon the regular study and testing of twenty-five babies in their homes, made by Professor Shirley and her collaborators. The first two volumes have already been reviewed in this JOURNAL, and the general method of the investigation described. This volume deals with the most difficult aspect from the point of view of exact enquiry; but general and to some extent tentative as the results may be, the work is undoubtedly a very useful contribution to the study of this aspect of early mental development.

[illegible] all-pervasiveness, patt[illegible]ange. The word "pattern" is used somewhat vaguely, and, I think would be more readily understood if defined as the relative proportion of strength of different elements or aspects of personality. Change or development in the personality is distinguished from normal development. Thus change in an individual that merely parallels the change of the group in a particular trait cannot be regarded as a true change in personality: it merely represents a developmental change. Only variations from the developmental course of the group represent true changes in personality.

The author recognizes that a "complete knowledge of family life and conditions is the essential background for an understanding of personality in the baby." It is true that the examiner visited the homes and saw the environment of the child at certain times; at the same time the knowledge of the family life and conditions cannot be regarded as complete as it might be approximately when the child is continuously observed in the home. The regular tests were given particularly in reference to "irritability" (screaming, "fussing," smiling, etc.), and the various kinds of situations that provoke irritability were noted. The author comes to the conclusion that the tendency towards either marked irritability or marked placidity is inborn (p. 40). A good many individual studies are recorded showing personality in profile graphs. The author suggests two general types of pattern, the one type "characterized by high general achievement, proficiency in speech, and a small percentage of non-adaptive responses; the other by achievement lower than developmental status, inferior development of speech and abundance of non-adaptive responses." This, however, seems largely to correspond to a distinction between the more precocious or intelligent and the retarded or dull children.

Interesting details are given confirming various other points as to individual characteristics and also in reference to twins and sex differences. This volume, with its two predecessors, makes a notable contribution to early child psychology.

C.W.V.

A Handbook of Child Psychology: Edited by CARL MURCHISON. Second Edition. (Clark University Press, Worcester, Massachusetts. London, Humphrey Milford, Oxford University Press. Pp. 956. 24s. 6d.).

The first edition of this important book was reviewed in this JOURNAL in February, 1932. The second edition is something considerably different from the second edition of most books. There is not merely an extension and revision of most of the articles, but the addition of a considerable number of entirely new ones. Thus the size of the book is increased from 711 to 956 pages. Nor does this increase give a full idea of the new material, as further space has been made by the omission of several articles dealing with subjects which the editor describes as topics not subjected to continued research. Thus we miss from this volume Helen Woolley's article on "Eating, Sleeping, and Elimination"; Susan Isaacs' on the "Experimental Construction of an Environment Optimal for Mental Development and Growth"; Arnold Gesell's on the "Psychology of Twins,"; also Beth Wellman on "Physical Growth and Motor Development and their Relation to Mental Development in Children"; Florence Goodenough on "Children's Drawings,"; Helen Marshall on "Children's Plays, Games, and Amusements,"; C. W. Kimmins on "Children's Dreams"; and Anna Freud on "Psycho-analysis of the Child."

In place of these the present volume includes new articles as follows: Leonard Carmichael, "Origin and Prenatal Growth of Behaviour"; Karl Pratt, "The Neonate,"; Arnold Gesell, "Maturation and Patterning of Behaviour"; Mary Shirley, "Locomotor and Visual-Manual Functions in the First Two Years"; Florence Goodenough, "The Measurement of Mental Growth"; Beth Wellman, "Sex Differences"; Sir Edward Travis, "Speech Pathology"; William Blatz, "The Physiological Appetites"; Phyllis Blanchard, "The Child with Difficulties of Adjustment"; and Leta Hollingworth, "The Adolescent Child." In addition, several articles have been considerably increased, for example, Mary Jones's article on "Emotional Conditions" becomes one on "Emotional Development" nearly half as long again.

It would be impossible, of course, in a review to give anything like a satisfactory account of this new material; indeed, it is nearly all very condensed itself, and provides on the whole a very thorough guide to the literature of the subject, although we find some omissions of English work. This further revision makes the new volume together with the first edition still more the most complete reference book on the psychology of childhood. It should be emphasized that it is not a book for the ordinary student, but rather for the student of certain departments of child psychology, and for the teacher or researcher in child psychology.

C.W.V.

General Principles of Human Reflexology: By VLADIMIR BECHTEREV. (Jarrold's, London. Pp. 467. 21s.)

This is a translation from the Russian of the fourth (1928) edition of Professor Bechterev's book. He calls it an introduction to the objective study of personality. The emphasis should be upon the word objective, for Professor Bechterev's characteristic note is the study of human psychology from the point of view of behaviourism without, however, excluding altogether the contribution which can be made by introspection. For example on page 61, the author admits that introspection is useful for the study of self and that the results of this can be supplemented by reports of others with a few modifications and cautions. As to introspection, however, as a means of interpreting by empathy the behaviour of others, he is profoundly sceptical, too sceptical in the opinion of the reviewer and probably of most English psychologists. The term reflexology is appropriate to these points of view because he attempts to build up the highest and most complex mental processes by the association and complication of reflexes. For example, the apparent teleological activity of the animal in getting at food in a maze is described under the term "aim association reflex." He does not, however, group himself with the behaviourist school, in fact he takes pains to point out that behaviourism arose subsequent to his own objectivism.

Even reports of others by language of inner experiences are unreliable because words associated with inner experiences may be associated with somewhat different inner experiences from those of my own. The general criticism indeed of subjectivism is along the usual lines adopted by the behaviourist and seems to be open to the same objections. Sometimes, for example, the author says a thing is obviously so when it would seem to be only obviously so if one relies upon introspection. What many psychologists would regard as indications of human behaviour are brought under the heading of complex organic reflexes, with stimuli arising within the organism, at least in part.

The book is a valuable account of experimental work in Russia not easily accessible to the English reader, and brings into relation with it a great deal of experimental work in other countries. On the whole, however, it is a discussion of the psychological theory resulting from these experiments rather than the detailed and critical account of the method. It is we think a valuable book for English readers, even if one profoundly disagrees with some of the main principles, for it is a useful discipline to attempt to explain human nature in the most mechanical way, if only to see where the explanation must be more than merely mechanical.

How We Think: By JOHN DEWEY. (D. C. Heath and Co. and G. G. Harrap and Co., Ltd. Pp. 301. 7s. 6d.).

This is a much enlarged, thoroughly revised edition of Professor Dewey's well-known book published twenty years ago. He came to recognize that, important as that book was, it was by no means clear and easy reading, and its usefulness was greatly limited by that fact. In the present edition revision has been made with the view to increasing clarity and to a re-statement of ideas that were especially found to be obscure. The result is a book which is a definite improvement from this point of view, and fuller material adds still further to its value.

Though philosophical and psychological throughout, Professor Dewey keeps the actual work of the teacher constantly in mind. Even now, however, we would not select clarity as the outstanding mark of the book. Too much still remains of abstract statement of processes which might be more clearly expounded by a definite concrete example. Such phrasing for example as " nevertheless, the conditions of the pupil's contact with subject matter may be such that he is compelled to come to quarters with its more significant features or such that he is encouraged to deal with it upon the basis of what is trivial," might as well be put in half the space and have been as clear. On one fundamental point we would gladly have had a more complete exposition from Professor Dewey. He rightly warns the reader against the ideas of general habits of thought as the result of the " practice of thinking in accordance with some logical formula," and of the transfer of such training to a wide range of subjects. What we must cultivate, argues Professor Dewey, are favourable *attitudes* and not merely knowledge of method: attitudes, such as open-mindedness, whole-heartedness, responsibility, and so forth. Yet the author does not make it clear quite as to how these differ from habits of adopting an attitude. Nor does he convince us that special training in adopting a certain attitude under certain circumstances will result in the attitude always being adopted under very different circumstances. In other words, while Professor Dewey rejects formal training in the usual sense of the term, at times he seems to adopt it himself.

These criticisms, however, are of secondary importance. The book in its new form is an important contribution to the study of the training of thought.

The Organism of the Mind: By O. RICHARD HEYER, M.D., translated by EDEN and CEDAR PAUL. (Kegan Paul. Pp. 271+xiii. 15s.)

This book makes most interesting reading, all the more interesting because many of the ideas expressed are so foreign to our English outlook. The translation from the German strikes the reader as excellent and the second part of the book is illustrated by beautiful reproductions of extremely interesting drawings made by patients during analysis. The essential unity of mind and body is stressed: the theories of Freud, Adler, and Jung are disc [illegible] e educationist the most interesting chapter will be that called [illegible] which the author admits that he knows of no way of successfully educating and treating children and adolescents except along Adler's lines. Strange statements occur at times. Some quotations will illustrate this, and at the same time give some idea of the general tone of the writing:

Page 226: " In the sociological field, except for a few venerable but tragical and quasi-derelict wrecks from this period, every one has now recognized that the 'rights of women' then acquired have brought them nothing but unhappiness, misery, avidity, and uprooting."

Page 227: " . . . the purely patriarchal epoch is decaying "; presumably in reference to Germany.

And the final sentence in the book:

Page 247: " Willy-nilly, analytical psychology has become a spiritual movement. I must be content, in these lectures, in this book, to have led you to the threshold of that revelation."

Commonsense Psychology in the Home: By FREDERICK H. DODD, M.R.C.S., F.R.C.P. (George Allen and Unwin, Ltd. Pp. 185. 5s.).

This is intended as a " handbook for busy parents and teachers." It is the outcome of child clinics and of the study of psycho-analytic literature. Its weakness lies in the fact that almost entirely it consists of dogmatic statements without any reference to evidence. True, they are generally moderate statements and no doubt will be widely accepted by many parents. Sometimes, however, statements are made emphatically which it would certainly be very difficult to substantiate. For example, the idea that an elder sister necessarily " mothers " her young, brothers would cause amusement in some families known to the writer. The book will, however, at least serve to raise problems and to remind the teachers and parents of points of view too apt to be overlooked.

The Case for Vocational Guidance: By ANGUS MACRAE, M.A., M.B. (Pitman, 1934.)

This little book should prove an admirable introduction to a study of vocational guidance. It is the material of three lectures given under the Health Clark bequest, by the Superintendent of the Educational Division of the National Institute of Industrial Psychology.

The first chapter, Occupational Choices, considers the ways in which young people commonly choose their occupations, and the reasons they offer in support of their choice. Questionnaire studies, though they have their limitations, have given results of interest and value, and this chapter discusses mainly information gained in extensive enquiries carried out in Birmingham, and also some in London. Obviously for many young people vocational choice is not based on a careful or comprehensive survey of the qualifications of the individual for the work desired.

It is unfortunate that on page 18 the writer suggests that certain reports were not anonymous when in reality they were. Also on page 18 one would like to find better grounds for the statement that " it would seem that the reasons given by the adolescent for his occupational choice are often no more than rationalization."

Chapter II considers the probable results of the choices made by adolescents on inadequate grounds—results not only to the individual himself but to society. The final chapter shows that though much useful work in vocational guidance is being done there is considerable room for improvement. Present limitations and possibilities of guidance are discussed and constructive suggestions made. The writer's style is lucid and attractive. F.M.A.

Practical Psychology in Character Development: By VERA BARCLAY. (London, Sheed and Ward. Pp. 190. 4s. 6d.).

In a recent issue of this JOURNAL, "The Psychology of Character," by R. Allers, was favourably reviewed. The volume now before us represents an ingenious attempt by the author to select actual passages from the larger volume; then by rearrangement and the addition of the least possible by way of her own connecting links, she enables the author of the larger volume to speak directly to the audience more definitely concerned with the immediate practical applications of the subject. The book should meet a need among parents, teachers, social workers, and others. It will be regrettable, however, if this volume should in any way lessen the number of readers of Dr. Allers' book; it should urge many to read the larger and more important work.

Psychology and the New Education: By S. L. PRESSEY. (London, Harper and Bros. Pp. 594. 10s. 6d.)

This is an interesting book on educational psychology Part I deals with Development during School Years under the headings of Growth, Health, Interests, Adolescence, Discipline and Intellectual Efficiency. Part II deals with Learning in Schools. The whole bears evidence of a keen observer and first-hand experimenter who has a good grasp of his subject. The book may be recommended to teachers who are anxious to increase their knowledge of modern experimental psychology in its bearings upon school problems.

General Psychology: By GARDNER MURPHY. (London, Harper and Bros. Pp. 657. 12s. 6d.)

This well-written and well-produced volume is a very useful addition to American text-books in general psychology. The author has shown much skill in his selection of material, has given many pictorial illustrations, has added useful references and problems to all chapters, has covered the ground necessary for an elementary course and has indicated the pitfalls for the student to avoid. Certainly it is a book to be on the shelf for reference, and it will be frequently used.

Psycho-Analysis: Its Meaning and Practical Applications: By DR. WULF SACHS. (London, Cassell and Co. Pp. 246. 6s.)

This book is based on lectures delivered under the auspices of the University of the Witwatersrand. The author has succeeded in presenting his subject clearly and lucidly, and has drawn most of his illustrations from literature rather than from clinical material. As most of the text has been read by Freud the presentation is authoritative. The layman who is prepared to do some hard thinking will find this a useful introduction to psycho-analysis.

One Thousand Juvenile Delinquents, their Treatment by Court and Clinic. By SHELDON GLUECK and ELEANOR T. GLUECK. (Harvard University Press and Humphrey Milford. Pp. 284 and appendices. 15s.)

This is the first volume of the Harvard Crime Survey, a scientific investigation into the incidence, causes, and treatment of crime in the City of Boston, Massachusetts.

The book deals with the problem of the juvenile delinquent. It is described as "A functional analysis of the effectiveness of one of the recognized American tribunals for children—the Boston Juvenile Court, and of a well-known child guidance clinic—the Judge Baker Foundation." In addition, and because the success of these institutions can be measured only by reference to the children with whom they dealt, one thousand cases are selected which have been referred to the clinic by the Court, covering a five-year period, 1917-22.

A favourite subject of debate amongst students of history used to be whether history is a science or an art. I believe the scientists usually won—a not unusual result in this age—though not without taking some shrewd blows. I do not believe that the substitution of " Treatment of Delinquency " as the debated subject would produce so easy a victory for science to-day, especially if the rival side was armed with this book. But the victory, to whichever side it went, would be as unreal as are the results of all controversies based on false distinctions, for scientific objectivity is impossible whether we are interpreting past actions or studying present conduct.

On the whole it is disturbing, especially to those who have put their trust too fully in the objective analysis of delinquency, to read this scrupulously fair record. The authors have examined with meticulous care the careers of a thousand delinquent children, and accustomed as so many have become to discountenance the extravagant claims made so frequently by those interested in the psychological approach to the problem of delinquency it is refreshing to find protagonists of clinical treatment so ruthless in their disclosures. For the conclusion reached by the investigators in this analysis is that the methods of one of the best child guidance clinics and one of the most progressive of Juvenile Courts have so far failed. Primarily these institutions are collateral treatment agencies and they are judged by the after-lives of the children they treat.

It would have been excusable to expect a far more satisfactory result from the co-operation of such admirable forces. Surely with a full psychiatric examination and an intelligent Court hearing it is possible to evolve a rational re-integrating plan of treatment. Superficially it appears that the factors precluding the adoption of such a plan are the inadequacy of the contact with the clinic—only one-fifth of all the cases had more than a single contact—and the inadequacy of the co-operation between clinic and Court. In the latter case it is true that " The carrying out of all the clinical recommendations by the Boston Juvenile Court in an individual case bears a consistent, but low, relationship to subsequent conduct " (page 183, see Table xxxvii), yet one may doubt the value of further clinical examination when " The number of contacts with delinquent boys after the initial examination is not significant as bearing on post treatment conduct " (page 183). May it not be that the more fundamental cause of frequent failure is the inadequacy of our knowledge of human nature. So little that we know of motivation is scientifically valid, so much remains to be discovered. For example, " If intelligence tests could be made much more precise there is more and more clinical evidence that the emotional life has an importance equal to—many psychiatrists insist greater than—the intellectual in the motivation of conduct. And in the measurement of emotional forces the arts of testing and predicting future responses are even less developed than in the intellectual field" (page 282, quotation).

The most serious aspect of the whole survey is in connection with the very high incidence of recidivism. Practically 88 per cent of the cases recorded came into conflict with the law in later life and nearly two-thirds of these for serious offences. It is legitimate to suggest that these remarkable figures may be due to the selective tendency of the Court. The book analyses the cases referred to the clinic by the Court and it is pertinent to question the system on which reference was made. The authors admit that there was no system. The judge of the Juvenile Court sent to the clinic those children who, in his subjective judgment, would profit by clinical examination. And as retarded children always present the greatest difficulty in disposal it is these children who figure largely in this survey. Thus Table VI (page 87), shows how poorly those examined at the clinic compared in educational attainment with Boston public school children. The fact is thus emphasized that this book is, as indeed it claims to be, a crime survey and not a survey of juvenile delinquency in general. Results of an experiment on a selected group are valid for that group alone, and this book portrays only the inadequacy of the Boston method of dealing with the cases reported to the clinic of the Judge Baker Foundation. Perhaps greater success would have been attained by the clinic with the cases *not* reported.

In conclusion, it is obvious that social and environmental conditions, influenced by hereditary tendencies, are the main factors bearing on delinquency. As the authors wisely suggest, it may be that a new approach to the problem is needed. Recognizing the contribution of intelligence tests, of the psychiatric approach, of endocrinology and of the "situational approach," there seems yet to be no more efficient method of treating a delinquent child than by the thorough case work of the intelligent social worker, and "social case work still has a good distance to travel before its effects can make themselves felt in the treatment of delinquency in a truly fundamental sense" (page 283). The pseudo-scientific approach of Court and clinic as analysed in this book is of minor value alone—and that conclusion, fully admitted by the authors, is the major value of the survey. W.L.C.

Examining the Examination in English ; *Harvard Studies in Education* : (Published by Harvard University Press ; Oxford University Press. Pp. 295. Price, 11s. 6d.).

This Report by the Commission on English appointed in 1929 by the Committee of Review of the College Entrance Examination Board, U.S.A., gives a brief history of the changes in the nature of Entrance Examinations in English from 1901 to 1930. Till 1916 there was one type of examination based on training in Grammar and Composition and the study of prescribed English classics. In 1916 an alternative type of examination, the Comprehensive, was established differing from the other in that there were no prescribed books, and that considerable importance was attached to ability to read with understanding and to ability to apply what has been learned to the interpretation of unfamiliar passages of literature.

A critical examination of the two types of examination and of the opinions of teachers leads to the conclusion that the Comprehensive Examination is preferred. The Commission states that it has the merit of placing upon the schools the responsibility for the selection of material to be studied, and that in examining it is concerned with the three major qualifications—adequate literary background, ability to comprehend the printed page, and power to express thought in correct and effective English.

Other matters of interest were investigated, e.g., the methods of assessing the value of scripts, the reliability of examiners, the degree of correspondence between performance at College and in Entrance Examination.

Though primarily of great value to American teachers, the Report cannot be ignored by teachers of English in English-speaking countries who are concerned with the problem of developing either for School Certificate or for entrance to a University a form of examination which really tests ability in English and not merely rote memory. A.E.C.

Psychology and Psychotherapy : By WILLIAM BROWN. (Arnold. Pp. 252. 12s. 6d.)

Dr. Brown hopes " that the discussions and analyses of this book will provide the general reader with a grasp of the position and achievements of psychology and psychotherapy to-day." One can say that he has succeeded in a very difficult task; the historical treatment of the subject shows the reader how modern [illegible] eached their opinions and the differences between the principal [illegible] n the nature and doctrines of the unconscious have been clearly [illegible] many of the classical examples of abnormal behaviour have been quoted, quite appropriately and usefully, in illustration of multiple personality, dreams, etc., Dr. Brown has drawn examples from his own case-books. Perhaps it is the personal touch introduced in this way that is not the least asset to the work; in any case further authentic instances have been long overdue. The examples now described indicate the varying degrees and origins of mental trouble, some are extreme, others are less so; while some are difficult to treat others yield to treatment with apparent ease. The point that stands out is that almost all are amenable to the right treatment.

The book never ceases to be interesting except when some complex phraseology is used. It is, however, a book for the general reader, as the author intended. The advance [illegible] nd valuable material and suggestion in it, but the practitioner [illegible] ust seek detailed descriptions of technique elsewhere. Dr. [illegible] employing free association and hypnosis; quite rightly he says very little about how they are used for he has not had a textbook of practice in view. The accounts of some of the cases leaves one with the impression that we still live in an age of miracles and that it is given to very few people to effect the cures described. Dr. Brown is a scientist and furthermore a medical man who had had exceptional opportunities to minister to the diseased mind. He has evolved ideas on the psychology of adolescence, of faith, of suggestion, of personal influence, and, as his introductory chapter promised, on the psychology of peace and war. He states them here. The ideas are well considered and well balanced; they stand as a protest against mechanism and materialism, indicating, as they do, a strong belief in the high destiny of man.

This book is probably the best contribution, apart from his mathematical work, that the author has yet made to the literature of psychology, and it deserves serious attention. Few writers can bring wider or more varied talents and training to bear on the subject Dr. Brown has chosen. A.P.B.

Improving Instruction in Reading : *An Experimental Study*, by WILLIAM S. GRAY. Supplementary Educational Monographs, No. 40. (University of Chicago, 1933. Pp. xiv+226. $1.75.)

The problem of instruction in reading is one which faces every teacher of children. It varies with their age, environment, and mentality, and also with the special circumstances governing individual schools, but it remains insistent throughout school life, and therefore challenges serious attention. This has always been so, but the pressure of contemporary conditions of living makes the problem daily more, and not less, acute. Only those, however, who are alive to the splendid opportunities offered by this most fruitful potential source of true education are aware of the difficulties in the way of seizing them, and many teachers, blind to any but the most obvious aims of the teaching of reading, are unaware of the existence of any problem at all. This failure in perception is responsible in England, as apparently also in America, for many missed opportunities, and for that dull, mechanical teaching which often achieves nothing, and is sometimes definitely harmful. Any attempt, therefore, to direct attention to this problem is likely to be useful. Professor Gray's monograph on " Improving Instruction in Reading " is the result of an enquiry undertaken in certain American schools, in order " to determine ways and means of reorganizing and improving the teaching of reading in harmony with the results of scientific studies." It deals with the difficulties encountered, and the effects that follow " vigorous efforts to improve teaching." The work done is described in great detail, and the conclusions lucidly and justly summarized.

It is clear that satisfactory methods of dealing with this problem must be sought, not in one, but in many directions, and Professor Gray's own perception of possibilities seems very sound. The mere English reader, ignorant of the difficulties confronting schools in America, may perhaps quail a little before what may be a necessary standardization of effort, but it is a hopeful sign that teachers, when adequately stimulated, can manage to effect improvement where it is needed.

Professor Gray is surely very right to emphasize the necessity for what he calls a "competent and professionally-minded staff." The teacher now, as in the days of our grandmothers, is all important, and the price of the "good" one (however we may individually define that term) above rubies.

Measurement in Radio: By F. H. LUMLEY. (Ohio State University, Columbus, Ohio. Pp. vi+309. $3.00.)

The book does not put in any claims to be a work on psychology in the direct sense, but much psychology is implied therein and the field of investigation is one in which the psychologist should fine plenty of scope for research.

"Measurement in Radio" has specific importance in those places where the use of radio-broadcasting has been commercialized. It is obvious that any firm, company, or corporation using the ether as a means of bringing its products to the notice of the public is entitled to know what it is likely to get for its outlay. In the advertising world the actual efficiency of the various media used is not always clearly known; indeed, it may be said that absolute measure is not known at all. Values are relative to one another in different media; what is perhaps still more important to note is that attempts to measure the efficiency of a selected medium may lead to disparate results because of difficulties which occur through unreliability in the persons tested. Again, as Dr. Lumley points out, even when reliability has been assured in accord with all the tests of a modern mathematical technique, the results cannot always claim to be valid. In drawing up questionnaires there are ample opportunities for suggestions to be made, and for wrong types of questions to be used, so that replies do not invariably express the true opinions of those who give them. The broadcasting station may make claims in all good faith for an efficiency which sound investigation does not confirm. These are but two out of many facts dealt with in the present book.

The problems of investigation are usefully treated, the author gives a fair criticism of the different methods in use; he covers a very wide field, dealing with listening habits, preferred hours and days for listening, the nature and arrangement of programmes, etc. There is a section devoted to psychological factors involved in listening and reporting on what is heard. Finally an Appendix of notes and a long Bibliography of 732 references amplify without disturbing the text of the book.

"Measurement in Radio" will be of use mainly for the researcher in advertising and the manufacturer, but it is not without value for research students in other fields for it contains many useful hints and suggestions, and is a text on methods of procedure.

A.P.B.

The Science of Work: By M. VITELES. (J. Cape. Pp. xi+442. 15s.)

The first two chapters of this book deal with the history of work up to the mechanical period and the introduction of business investigation and psychological research in the industrial field. When the author discusses fitness for work, he approaches the problems of vocational tests and the great task of selecting from a vast amount of accumulated research reports just that which is sufficient and appropriate for forming the basis of his science. He is concerned with analysing special abilities and making job-psychographs leading to what may be looked upon as normal requirements for selected occupations and the kind of patterns of capacity generally found in the persons pursuing them.

The toll of life by accidents in factories appears to be enormous; it emphasizes the need for psychological tests to find to what extent workers are prone to meet with accidents. The factors bearing on accidents are discussed. The list includes sex, humidity of the air, fatigue, illumination (or lack of it), and others which are dealt with at some length.

Acquiring skill at work brings one to the facts of learning, rate of improvement, variation in rates of production and the value of such process-instruction as will lead to appreciation of the part one's own share of a task bears to the whole job. In a later chapter the author deals with making work worthwhile.

To make work easy implies not only a discussion of muscular work and the tissue consumption of the body, but there are the very important questions of monotony and boredom, illustrated by diagrams which bring out the author's point very clearly. The ofttimes humorous pictures appearing elsewhere in the book are a pleasing asset.

Some interesting notes on co-operation follow on " saving the misfit," and except for the copious references, they bring the book to an end.

No mean degree of skill has been required to weave a coherent account out of the abundant material available. Such conclusions as may be drawn appear to lead to irrefutable principles so that this encyclopædic book may be regarded as an advance in the study of work and the workers. What has been brought together in the four hundred and more pages of the volume is sufficient to indicate that principles can be laid down and applied with predictive value in industry when conditions of labour, environment, etc., are comparable with those under which the principles evolved.

Incidentally, therefore, the title " The Science of Work " is justified.

A.P.B.

Beauty and other Forms of Value: By S. ALEXANDER. (Macmillan. Pp. 305. 10s. 6d.)

While considerable parts of this volume consist of material previously published in papers, the book as a whole is an important new contribution to the study of æsthetics and of value. Professor Alexander points out that one may approach the study of value in two ways : either by considering first the idea of value in general and then proceeding to a study of particular values, or by examining first some of the chief values themselves. It is this latter method the author prefers and he thinks the study of beauty is the " best or the easiest way to approach the study of value in general."

Part I then deals with such topics as the nature of beauty, the creative process in the artist's mind, poetry and prose in the arts, and the objectivity of beauty. Beauty for Alexander is " that which satisfies objectively the æsthetic impulse, that is, the constructive impulse used contemplatively." The objectivity depends on a reference to minds other than that of the individual. A beautiful object has value " only in so far as it satisfies a standard mind " (page 175).

Part II deals with Truth and Goodness, and other values, Part III being comparative and treating of value in general. These highest values lie in a relation—in " the satisfaction which these creations of mind give to certain specific impulses " (page 277). But psychological value is " not exhausted in its pleasureable element. There is also an objective element " in that they are useful to the type or kind.

No book on such a subject can be expected to be easy, and Professor Alexander's exposition of value is at times not very lucid. For the ordinary student it would be helped perhaps by a more frequent grouping together of the fundamental ideas presented in different parts of the book. It is, however, a work that no student either of æsthetics or of moral philosophy can afford to neglect.

Modern Education of Children: Edited by NANCY CATTY. (Methuen and Co. 4s. 128 pp.).

" The writers of the several sections of this book have worked under varied conditions and in very different types of schools, but they have one belief in common—a fixed conviction that ultimately the only urge to the acquisition of living knowledge or skill is the interest of the learner. . . . What has been done can be done again and, in all probability, better. The writers, who describe work actually carried out under normal school conditions, would be the first to assert that similar work could be done by any teacher who agrees with the summary of conclusions appended to this book."

The above extracts from the editor's preface provide the keynote to the book—which is a sympathetic and straightforward account by experienced teachers of their adventures with different methods, the resultant joys and depressions, in the effort to arrive at an ideal system for the education of young children. They arrive ultimately at the idea of the " child-centred school " in which the " project " is the dominating note of the curriculum; and the book provides perhaps the fairest and most reasonable description of the project method yet available.

The chapter on " The Acquisition of Formal Training " suggests, happily enough, methods which are efficiently " informal," and there are chapters on " New Methods in Selected Subjects," viz., Geography, Music, and Nature Study, which are full of pleasant suggestions.

This is a delightful book to put into the hands of the young teacher requiring guidance, or of the experienced teacher who feels that perhaps she is not doing the best for her children and yet fears to break away from the established tradition. To such readers the authors offer not merely the details of a " new method " but a clear and convincing exposition of its underlying principles. L.E.S.

Retrospect and Prospect: By SARA A. BURSTALL. (Longmans, Green and Co. Pp. 286. 7s. 6d.)

In a brief introduction Sir Michael Sadler calls this " a wise, brave and heartening book." In endorsing this we may add that it is a stimulating and often most entertaining book. The student of education will find it an interesting history if only partial and from the point of view of one individual, of the development of the education of girls in the latter part of the last century and the earlier part of the present. In the earlier years Miss Burstall's enthusiasm for the improvement of the position of women appears very clearly, but this does not by any means prevent her from seeing with great clearness and sanity the desirability of a difference of the curriculum for girls. In particular it is remarkable how she anticipated some quite recent widespread demands in her earlier years at Manchester High School for the broadening of the education of girls. The book is livened by many a human touch; for example, it is delightful to read that Miss Burstall bought herself a new hat to fortify herself against the interview for the post at Manchester. Without a trace of egoism Miss Burstall reveals herself as a forceful character and independent thinker. We heartily support Sir Michael Sadler's commendation.

The Medium of Poetry: By JAMES SUTHERLAND, M.A. (Published by the Hogarth Press. Pp. 168. Price, 3s. 6d.)

The author maintains that the work of the poet conforms to the general principle that if one knows precisely what one is going to do one does it, but that if one does not know precisely what one is going to do, then what one does is partly determined by the details of the means used. He illustrates this thesis by reference to the influence of tune, thought form, rhyme, and words in the production of poetry.

The author has deliberately avoided the terminology of psychology but has shown that a knowledge of psychological principles can aid in the understanding and valuing of poetry. A.E.C.

Adult Education in Practice: Edited by R. PEERS. (London, Macmillan and Co. Pp. 301. 7s. 6d. net.)

This valuable volume is prepared under the auspices of the Association of Tutors in Adult Education. The editor, assisted by a very competent staff, has given his readers an adequate account of the aims and history of the Adult Education Movement in this country, and of the present organization of that department of education. Discussions follow on the Adult Student and on Methods of Teaching. Brief chapters deal with the need for extending the work of adult education and with the opportunities available for full-time studies. References are made continuously to the importance to adult education of such additional aids as broadcasting and films. A useful set of appendices is also added. The book is therefore a very useful reference book on most topics connected with adult education.

English Instruction in the University High School. (Publication of the Laboratory Schools of the University of Chicago. Pp. 178. Price, 1 dollar 50 cents.)

This detailed account of the work in English in the University High School, Chicago, should prove of interest to teachers of English in Secondary and Public Schools in which English is the medium of instruction. It shows how this school, exceptionally favoured both in its selection of pupils and in its connection with the University, attempts to secure individualized instruction, remedial work for deficiencies in reading and the use of language, co-operation of the English department with all other departments of the school, the stimulation of voluntary creative writing, and the promotion of reading as a worthy use of leisure time.

The book contains many suggestions for teachers of English which should prove stimulating and helpful, though it would have been more valuable if examples of the improvements made by pupils working under the various schemes had been included. Without such examples it is difficult to estimate the value of experiments in methods of teaching. A.E.C.

Lateral Dominance and Visual Fusion: By CHAS. A. SELZER. (Mr. Milford, Oxford University Press. Preface+119 pp. 6s. net.)

What is lefthandedness? How does it occur on the basis of age, population, sex, mental defectiveness, etc.? How is it related to eyedness? What effects, e.g., stammering, follow attempts made either early or late in life, to convert it to righthandedness? How far is preference for using the right hand the result of training?

The author has investigated these and kindred problems which are of interest to the teacher, some of whom will have met with instances of reversed letters in children's writing (and reading). The means of diagnosis are suggested and methods of remedial treatment are outlined.

The research sums up the work of many other investigators and carries on a further step. The results and recommendations should be put before teachers, especially teachers of young children. They should also certainly be studied with care by practitioners in children's clinics.

Progressive Schools: their Principles and Practice: By L. B. PEKIN. (London, the Hogarth Press. Pp. 197. 6s.).

Mr. Pekin, well known as a trenchant critic of public schools, presents his readers with some pictures of life in some of the newer types of schools rather loosely classified as Progressive Schools. He discusses in a direct and forcible way such topics as " Co-education," " Social and Moral Teaching," " Freedom and Discipline," " Sex Teaching," and closes the book with an interesting chapter on " Life in a Progressive School." People who are desirous of knowing something of some of the tendencies in certain experimental schools will be interested in this little volume. Critics will find much to discuss and criticize.

The Will to Fuller Life: By J. H. BADLEY. (London, Geo. Allen and Unwin. Pp. 282. 10s. 6d.).

The Head Master of Bedales has earlier given us " The Will to Live." Here we have the necessary complement to that volume, and, happily, the promise of a third to deal with the more definitely religious aspect of life and living. These volumes are the outcome of discussions with groups of boys and girls in their last year at Bedales, and this one is concerned with the development of the sense of values. The chapters deal with Truth, Beauty, and Goodness in the writer's own charming manner, and the book will be read with pleasure by many who have long passed the age of the sixth-former.

An English Bibliography of Examinations (1900-1932): By MARY C. CHAMPNEYS. (Published by Macmillan and Co., Ltd. Pp. 141. Price, 5s.).

This Bibilography, prepared by the author under the direction of Sir Michael Sadler and Sir Philip Hartog for the International Institute Examinations Enquiry, consists of a bibliography of books and articles in periodicals published in Great Britain from 1900 to 1932 with a short list of other publications bearing on the examination question. It is a comprehensive and valuable reference book which should be of great use to those who have to deal with the improvement of examinations and to those who are engaged in research on the subject. A.E.C.

A New World in the Making: Edited by WYATT RAWSON. (New Education Fellowship. Pp. xi+365. 7s. 6d.)

A survey of the lectures and discussions at the sixth world conference of the New Education Fellowship held at Nice in 1932, with an introduction by Sir Percy Nunn. The conference was attended by 1,800 delegates from fifty-three different countries and the contributions of a notable list of educationists are ably woven into a continuous narrative by the editor, the result being, to quote the Introduction, " a document of intense interest which deserves the close attention of all serious students of education."

The Elements of Speech: By J. M. O'NEILL and A. T. WEAVER. (London, Longmans, Green and Co. Pp. 534).

This interesting and well-known elementary text-book has been revised and in its present form will be welcomed by many teachers in England. Although essentially an American text-book it will be a useful reference book for those who are interested in the functions of speech.

FOREIGN JOURNALS.

Internationale Zeitschrift für Erziehungswissenschaft: 3. Jahrgang, 3. Heft.

The following notable passage occurs in an article by Joseph Dolch of München on "Educational Literature in the Third Reich in Germany": "Towards the end of the year 1932, still more with the political break-through of the populace in the spring of 1933, our reader saw himself faced with a flood of books and pamphlets which all now preached the popular national-socialist pedagogy. In shining black-white-red or entirely red covers, adorned with great swastika they offered themselves. Thus our pedagogue has made many a blunder and much useless sacrifice of time and money. A friendly editor told him that he had received more than one manuscript *in which there were hurried hand-written addenda, national and popular, inserted into the otherwise typewritten text.* Also our friends abroad should be pressingly warned against this time-serving (Konjunktur) literature. From the leading men of the school and education policy of the national-socialist state there is indeed here and there a speech or a short article published, but so far (Autumn, 1933) *greater works are lacking.* At the time it is more urgent to do than to write. Some very [illegible] little scraps on university reform have appeared." [Translator's italics.]